the OIL AND GAS JOURNAL

When we hit hard formations I like to use the REED '2C'

. . . says Ellis Bruce, tool pusher for Wheless Drilling Company, Shreveport, La.

REED
Liquid-blast
ROCK BITS

"For Travis Peak drilling I use a lot of the **REED** '2C' series of bits. I use them because my bit records show that I can depend on them for good long runs."

Mr. Bruce is shown here with a **REED** "2C" Rock Bit. **REED** "2C", "2CW" and "2CWW" Bits do a good job in Travis Peak drilling.

For good long runs use the **REED** 'LB'

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

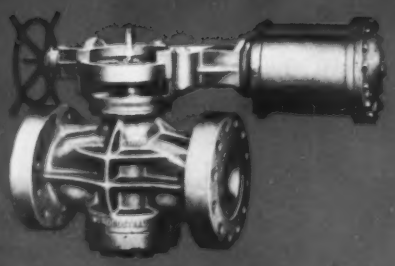
PRICE 50 CENTS TABLE OF CONTENTS PAGE 51 FEBRUARY 8, 1951

New Operating Economy

WITH POWER ACTUATED

Nordstrom VALVES

Nordstrom valves equipped with electric motor operators at an underground gas storage plant



CYLINDER OPERATED TYPES
for automatic emergency shut-down of gas lines and other applications

Local or Remote Control

POWER OPERATED valves on gas lines in field and plant are becoming the modern trend in more effectively saving man-hours and insuring quick, positive, and precise control. Operation can be directed from a remote central station. Nordstrom lubricated valves are especially suited to power operation, and are available with all standard types of operators — electric, simple or automatic cylinder, or pneumatic motor. Nordstrom engineers will assist in selecting the type best suited for the requirements of your particular installation. Request Pipe Line Bulletin V-210.

Nordstrom Valves

NOW AUTOMATICALLY LUBRICATED WITH Hypermatic

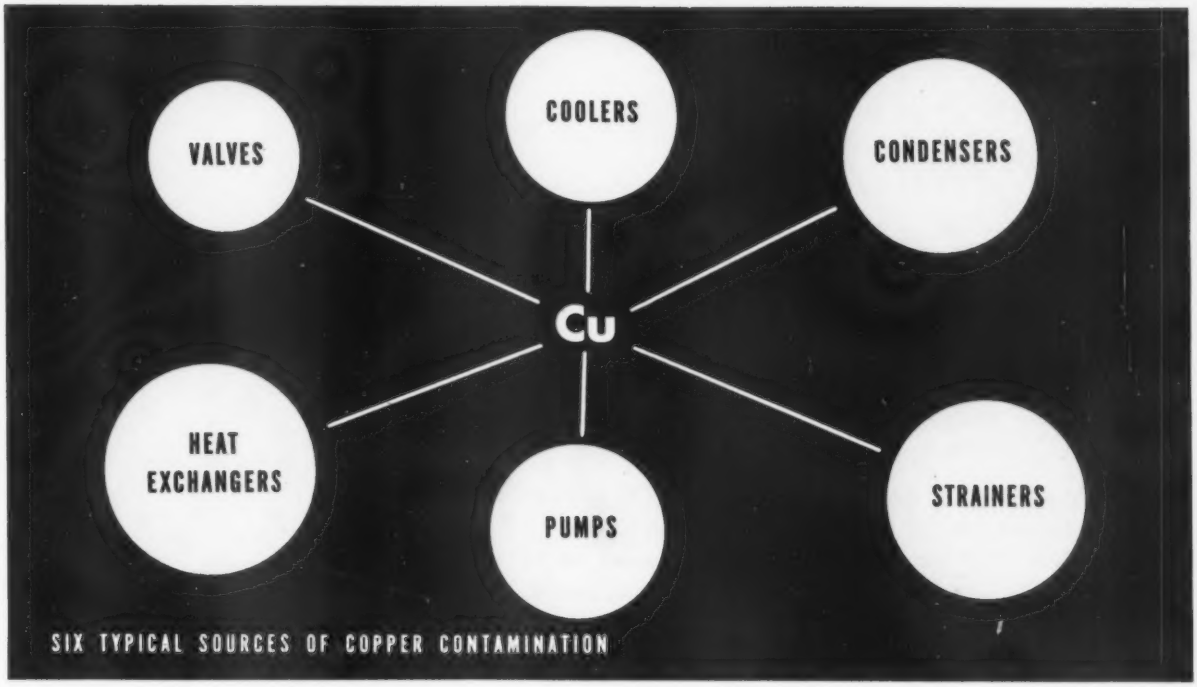
TRADE MARK

PATENTS APPLIED FOR

ROCKWELL MANUFACTURING CO.

400 North Lexington Avenue, Pittsburgh 8, Pa., Offices in all principal cities

Export — Rockwell Mfg. Co., International Division, Empire State Building, New York 1



Why More and More Refiners Use Du Pont Metal Deactivator

Refiners are becoming increasingly aware of the possibility of copper contamination originating from pumps, valves, condensers and other equipment used in the manufacture of gasoline.

Since even one part of copper in several million parts of gasoline will affect storage stability adversely, more and more refiners are turning to Du Pont Metal Deactivator as an economical means of counteracting this effect.

Du Pont has refinery case histories which show how antioxidant treating costs have been materially reduced through the use of Metal Deactivator. Your Du Pont Petroleum Chemicals Division representative can show you instances of savings of 35% and more. Why not contact him today for detailed information . . . and to arrange for tests on your own stocks made by a Du Pont District Laboratory?

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

Make Du Pont the Source for All of Your Gasoline Additives . . . Tetraethyl Lead Compounds (Motor Mix—Aviation Mix)—Antioxidants—Metal Deactivator—Dyes

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

IN CANADA: Canadian Industries Limited—Toronto, Ont.—Montreal, Que.

Meet the Power behind the Pump!

● If you haven't met the Fairbanks-Morse QZK Motor, you've been missing something. This efficient unit can do *more* for your pumping equipment . . . deliver the dependable, economical power you want.

Only the QZK has the truly indestructible Copperspun Rotor that gives you the best possible operation under any permissible voltage variation . . . gives you the *most,* for its type, in handling heavy starting loads . . . takes long period, peak capacity operation.

With its unique, one-piece cast frame, the QZK is protected against falling particles and dripping liquids. Cross-flow ventilation permits operation at a uniform, cool temperature.

Get acquainted with the QZK today. See your supply store or write Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE,

a name worth remembering

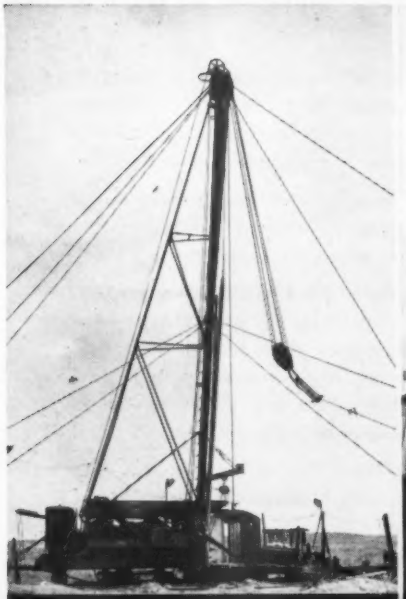
OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE AND HEATING EQUIPMENT • RAIL CARS • FARM MACHINERY.

For better service and more economy

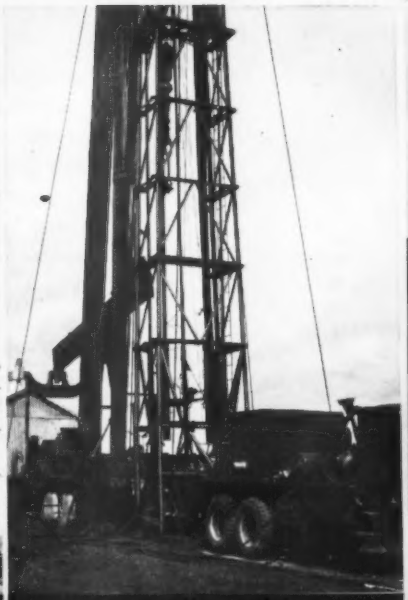
Order from a thousand and one

MACWHYTE WIRE ROPES

For rotary drilling



For cable tool drilling



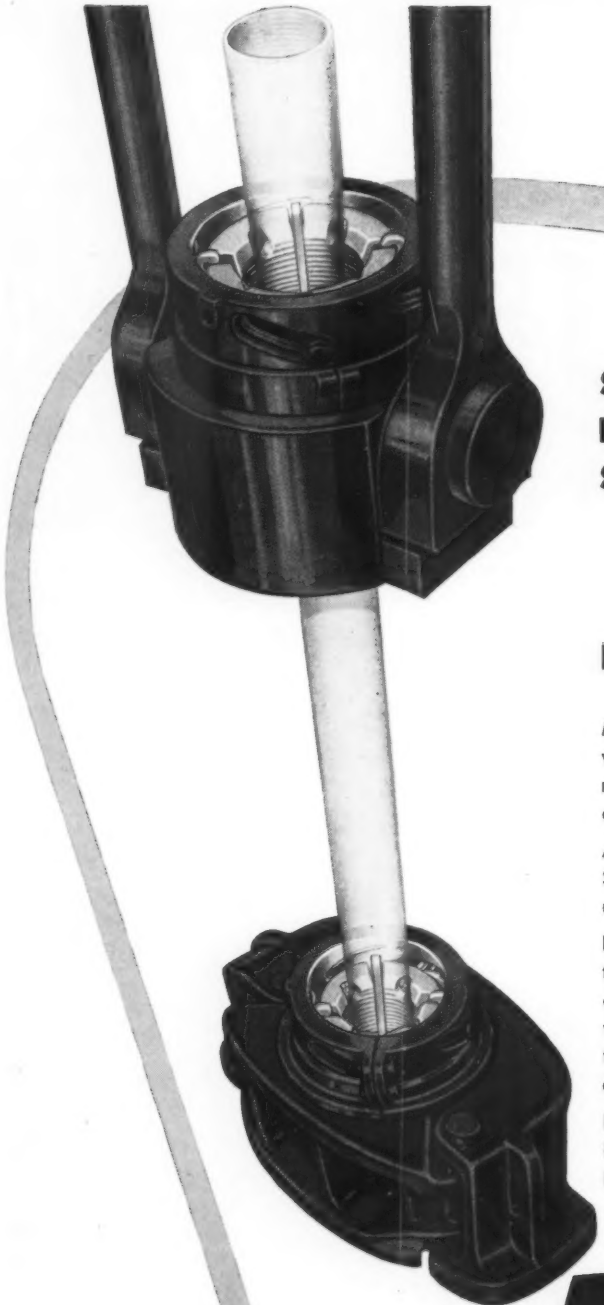
For well servicing

For pipe lines

You'll get maximum service from wire rope that has been specially designed for a special job. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. It will pay you to get Macwhyte Wire Rope that has been job-proved and engineered for your particular equipment. Recommendations are promptly available from Macwhyte distributors or Macwhyte Company.

MACWHYTE COMPANY, *2916 Fourteenth Avenue, Kenosha, Wisconsin. Manufacturers of Monarch Whyte Strand PREformed, Internally Lubricated Wire Rope, Atlas Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Mill Depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Catalog on request.*

MW-O



SAFE . . . . .
FAST . . . . .
STRONG . . .

IDEAL

ELEVATORS and SPIDERS

Men and casing are safe when the rig is equipped with an "Ideal" Elevator and Spider. The casing cannot be released accidentally, and manual controls are located to protect fingers and hands.

All four slips in "Ideal" Automatic Elevators and Spiders operate together. The spider won't release until the elevator has taken the casing load.

In "Ideal" Type S Automatic Elevators and Spiders, the precision-machined wickers are insert-type . . . easily replaced at low cost right at the rig. All "Ideal" wickers are precision-machined from extra-tough steel to provide a firm but gentle grip that hangs on to casing without marring or collapsing it.

Learn more about "Ideal" Elevators, Spiders, and insert-type slips . . . your National Supply Store has bulletins, or write us.

THE NATIONAL SUPPLY COMPANY
GENERAL SALES OFFICES: TOLEDO, OHIO
NATIONAL BLUE PRODUCTS

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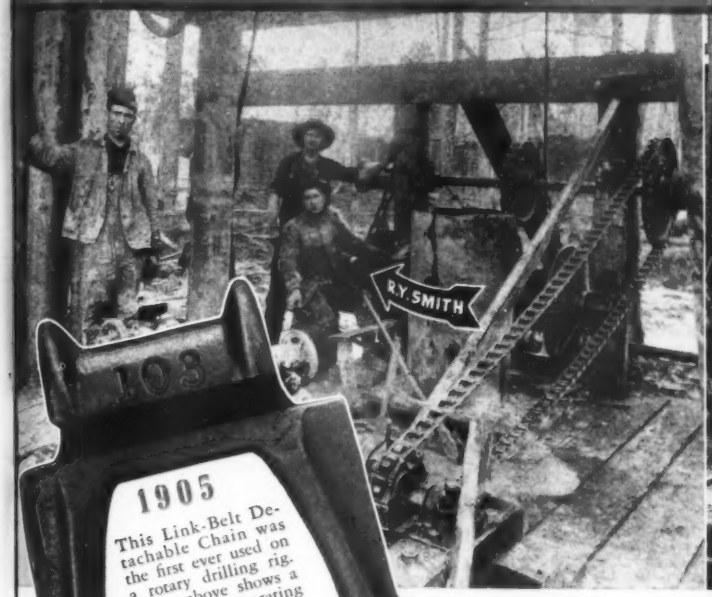
CANADA: THE NATIONAL SUPPLY COMPANY, LIMITED, ROOM 202, ALBERTA BLOCK, CALGARY, ALBERTA.
EXPORT: NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N. Y., U. S. A. RIVER PLATE HOUSE, 12 SOUTH PLACE, LONDON E. C. 2.

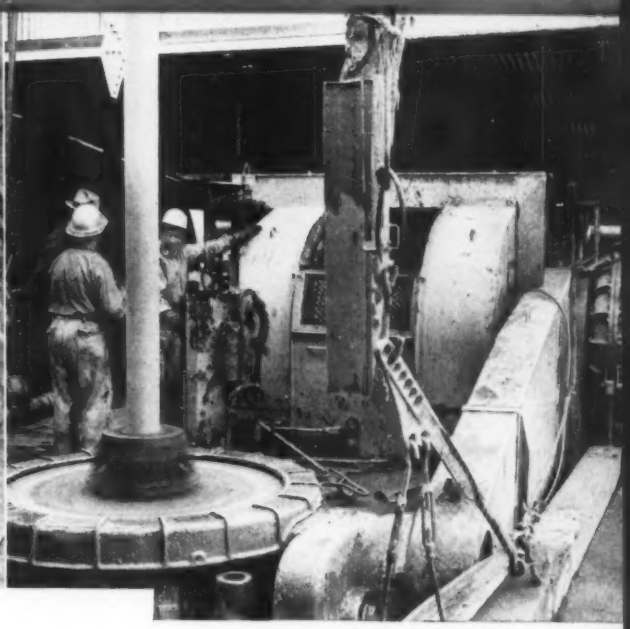
NATIONAL OIL FIELD MACHINERY AND EQUIPMENT . . . SPANG PIPE . . . SUPERIOR & ATLAS ENGINES

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951

LINK-BELT Chain *Rolls On!*



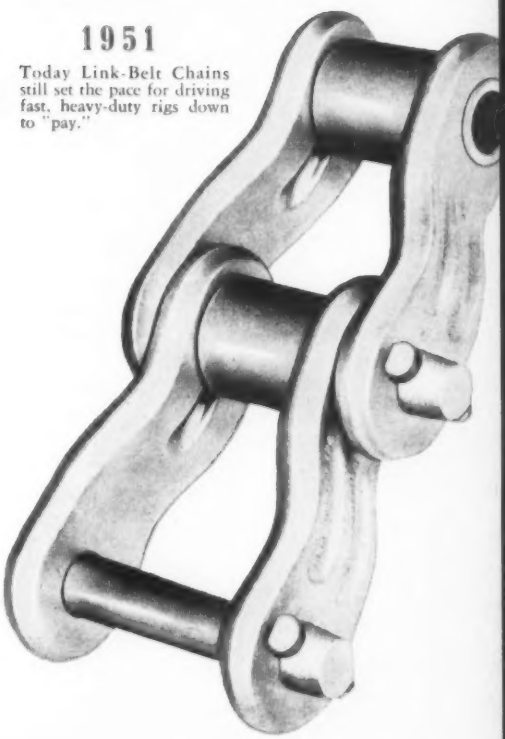
1905
This Link-Belt Detachable Chain was the first ever used on a rotary drilling rig. Photo above shows a drilling rig operating in the Sour Lake, Texas field in 1905, equipped with this chain.



◀ Yesterday *and Today* ▶

1951

Today Link-Belt Chains still set the pace for driving fast, heavy-duty rigs down to "pay."



Pictured here is a story of progress in the fabulous oil industry . . . . from a struggling infant to a scientific giant.

Spindletop is entering its 50th year. It gave the world its first gusher oil on January 10, 1901, opening the way for modern transportation and uncountable other steps toward better living.

Link-Belt is entering its 76th year. Link-Belt began making chain in 1875, the company being founded upon the invention of Ewart Detachable Link-Belt, illustrated on the left, which was exhibited in 1876 at the Philadelphia Centennial along with the first "approved" bicycle. Edison and Steinmetz were still unknown; locomotives were crude "iron horses;" the "horseless carriage" wasn't even in the dream stage.

Link-Belt Chain served as the drive on the first rotary drilling rig. Link-Belt Chains have kept pace year after year with the march of progress in oil. They have met every new demand as drilling depths went deeper and drilling loads grew heavier. In 1950 Link-Belt Chains served as the drive on the only well drilled below 20,000 feet. Our scientific research in chain keeps making new highs in power drive performance and will continue to do so . . . . for Link-Belt will never stop improving chain.

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 1, Los Angeles 33, Kansas City 8, Mo., New York 7, Toronto 8.
Distributors in all fields.

12.241

LINK-BELT

CHAINS AND SPROCKETS

A Type for Every OIL INDUSTRY SERVICE

SAFE . . . . .
FAST . . . . .
STRONG . . .

IDEAL

ELEVATORS and SPIDERS

Men and casing are safe when the rig is equipped with an "Ideal" Elevator and Spider. The casing cannot be released accidentally, and manual controls are located to protect fingers and hands.

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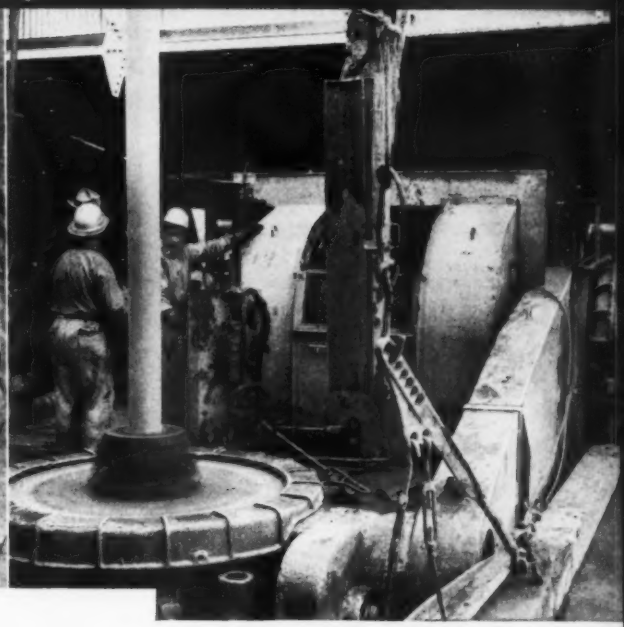

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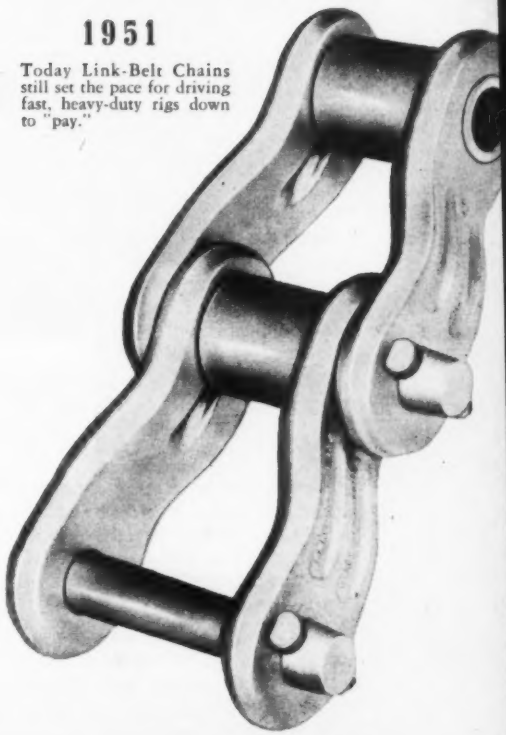

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LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 1, Los Angeles 33, Kansas City 8, Mo., New York 7, Toronto 8.
Distributors in all fields. 12,241

LINK-BELT

CHAINS AND SPROCKETS

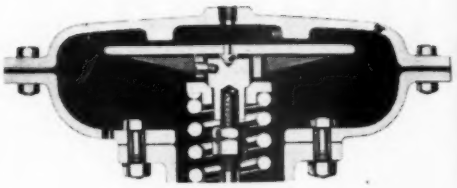
A Type for Every OIL INDUSTRY SERVICE

XUM

COMPARE

THIS FEATURE

OF THE HONEYWELL SERIES "700" VALVE



Pre-Molded Neoprene Diaphragm, with rolling action. Eliminates wrinkling or buckling . . . responds to slightest change in signal air pressure . . . withstands excessive pressures . . . available with cotton or nylon reinforcement . . . permits use of gas as actuating medium.

✻ Compare the diaphragm assembly of this valve with that of any other wide band proportional type. Look at it closely . . . study it feature by feature.

Then check the other features of the valve . . . the Duplex Stem Guide, the One-Piece Bonnet, the Packless Bellows Seal, the Safety Stem Lubricator, the wide variety of discs, the easy reversibility in the field from direct to reverse acting, or vice versa.

Your comparison will prove that the Honeywell Series 700 has *all* the features you look for in a fine valve.

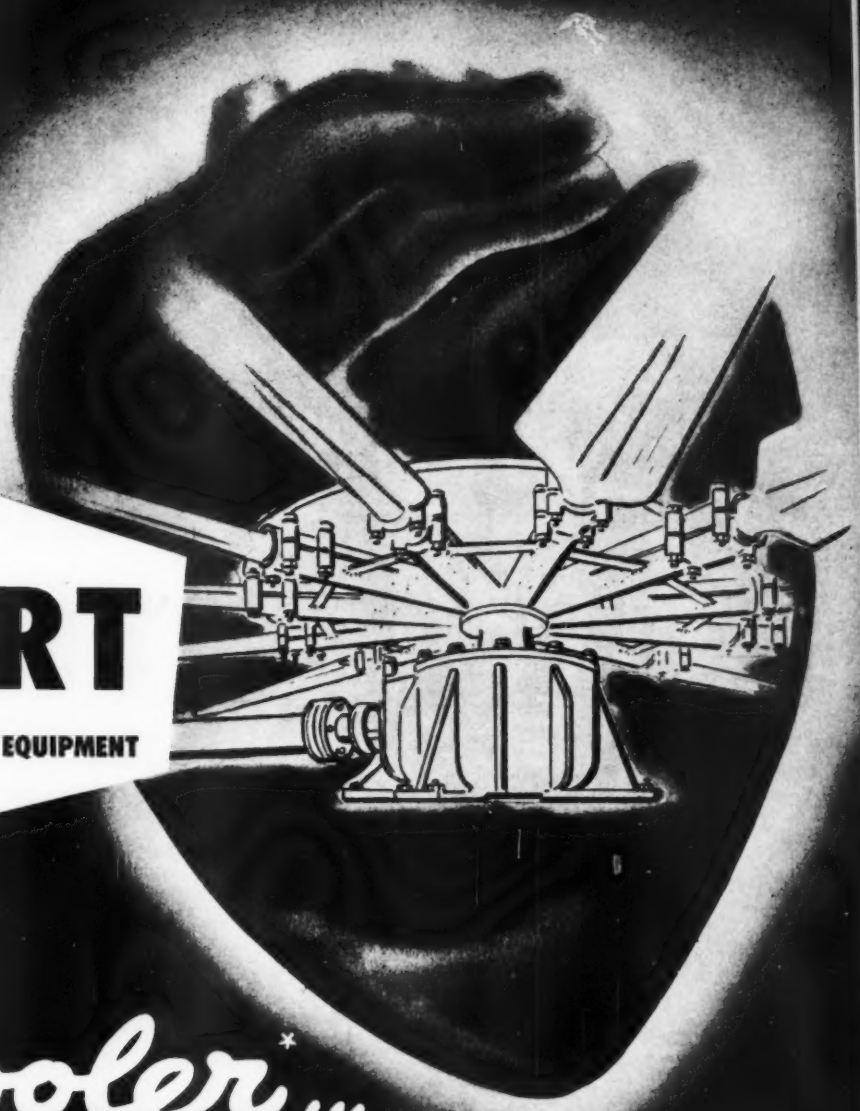
It's available in a wide range of styles and sizes. For detailed information, write for a copy of Bulletin 750 or call in your local Honeywell engineer . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1906 Windrim Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

MINNEAPOLIS **Honeywell**

VALVE PRODUCTS

XUM



The HEART

IS THE MECHANICAL EQUIPMENT

DriCooler*...

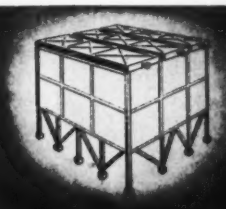
. . . the only finned tube cooling units that have mechanical equipment proved in over 5,000 actual installations.

Fans, driveshafts, Geareducers and fan cylinders long used successfully on the toughest air moving job—water cooling towers—have been further improved and tailored for the DriCooler.

This new mechanical equipment with the "Made-by-Marley" label is your guarantee of "stout-hearted" air-cooled units.

Induced Draft horizontal heat transfer surface under the fan.

*DriCooler is the exclusive trade-mark of The Marley Co., Inc.



Forced Draft horizontal heat transfer surface over the fan.

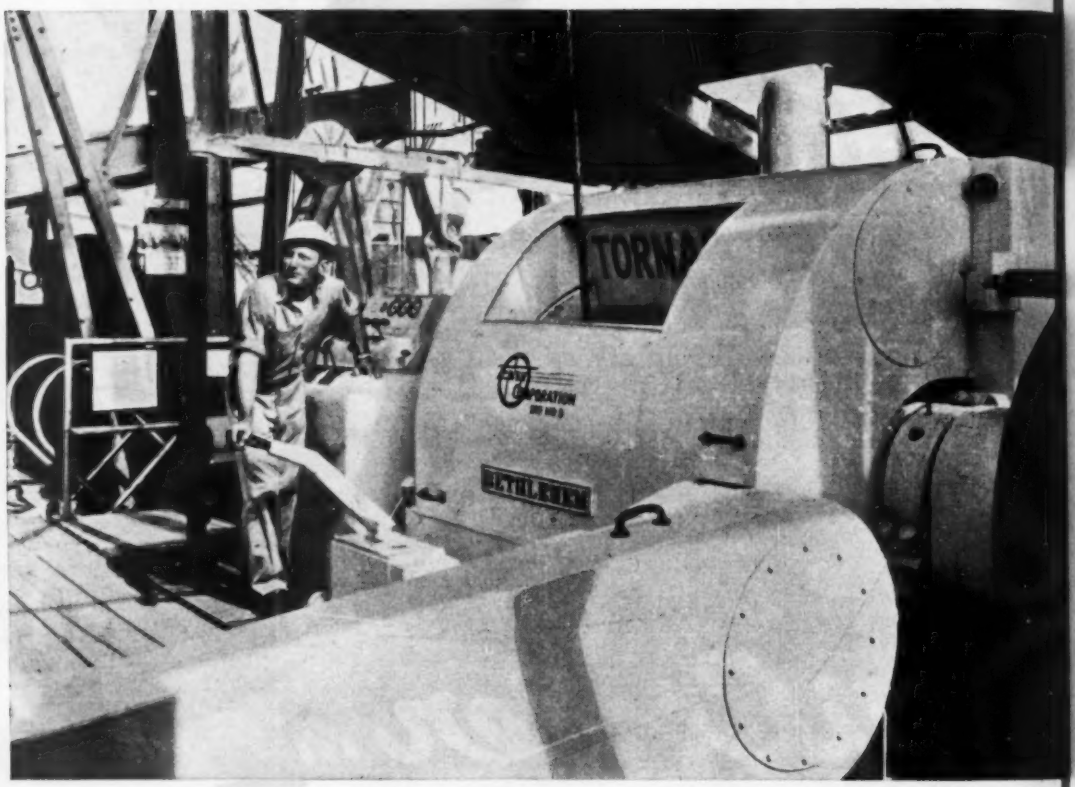
MARLEY DRICOOLERS

THE MARLEY COMPANY, INC. • KANSAS CITY 15, KANSAS

WATER COOLING TOWERS • DRICOOLERS • SPRAY NOZZLES

XUM

How can a BIG rig be so smooth?



That's a common question among drillers who know the Bethlehem Tornado. It's big, all right; a burly, deep-drilling giant with power to burn. Sturdy isn't the word—it's rock-rugged. Yet it is smoother, easier to handle, than many a smaller unit.

The Bethlehem Tornado has power without complicated mechanisms; power so well controlled that the driller's job is easy. Air controls are part of the answer. But other factors enter, one being the self-adjusting, air-actuated clutches. Another is the air-cushioned transmission, which reduces shocks and jolts to the vanishing point.

Before buying your next deep-hole rig, investigate the Tornado. Study the power, smoothness, and flexibility so skillfully blended in this big outfit. Any time you say, a Bethlehem man will be glad to review its features with you, point by point.

BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second Street, Tulsa, Okla.

Subsidiary of Bethlehem Steel Corporation

On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

It pays to use . . .

Strata-Seal

TRADE MARK

to combat lost circulation of drilling mud

Here's a remarkable new product to eliminate or reduce loss of circulation and returns. Recently made available to the oil industry, Strata-Seal has already proved to be one of the most highly effective developments in the long search for a practical material to combat lost circulation. It saves on mud costs, it cuts rig down time.

So effective is Strata-Seal's bridging action, that even in a number of extreme cases, it has restored circulation and saved abandonment of wells.

Check these savings with Strata-Seal

1. Strata-Seal protects investments by making possible reclamation of wells about to abandoned.
2. Eliminates or reduces rig down time.
3. Savings resulting from ability to screen.
4. Has no detrimental effect on viscosity, water content and gel strength of drilling fluid.
5. Is easily added to mud.
6. Does not interfere with coring operations

Available through leading mud service companies. See and feel Strata-Seal — write us for a free sample vial.

Write to Dept. 13.

Strata-Crete

TRADE MARK

. . . an aggregate to lighten your cement slurries

More and more oil men are discovering that cement slurries made with Strata-Crete give them these four practical, valuable advantages — at low cost.

1. Strata-Crete substantially lightens the cement slurry.
2. With Strata-Crete, higher columns of cement can be pumped with lower pressures.
3. Strata-Crete and cement facilitates perforation.
4. Strata-Crete helps materially to reduce lost circulation of cement.

Manufactured to rigid specifications, Strata-Crete is a uniform aggregate which can be used with high early, slow set, or standard oil well cement. It's suitable as an admix in bulk cement, or can be mixed right on the job.

Strata-Crete is available through leading oil well cementing concerns. Write us for more information, and for sample vial. See for yourself the uniform quality, the light weight. *Write to Dept. 13.*

LOW COST

UNIFORMITY

4 CUBIC FEET

GLC®

STRATA-CRETE SALES

Great Lakes Carbon Corporation, 18 East 48th St., New York 17, N.Y.

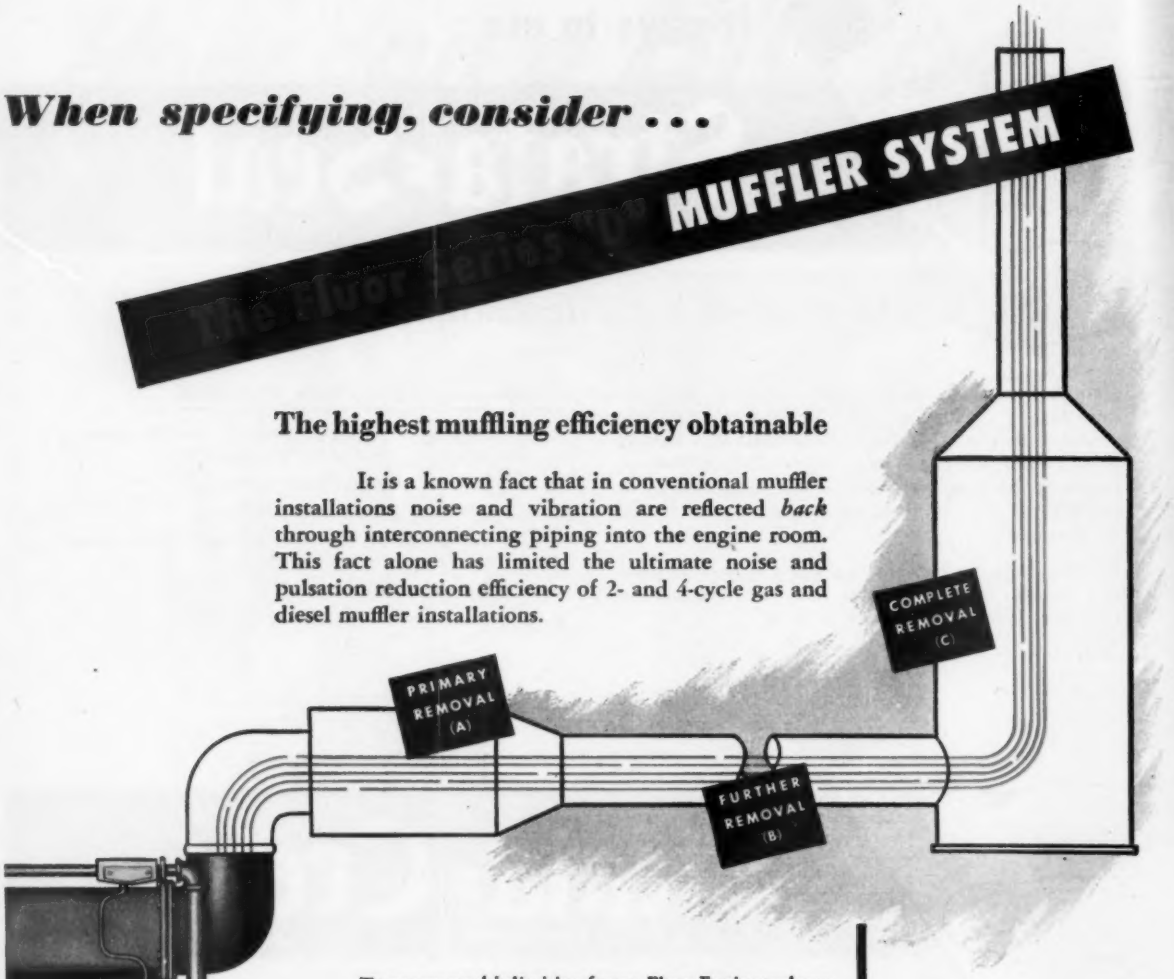
Sales Offices in Principal Oil Centers

When specifying, consider . . .

The Fluor Series "D" MUFFLER SYSTEM

The highest muffling efficiency obtainable

It is a known fact that in conventional muffler installations noise and vibration are reflected *back* through interconnecting piping into the engine room. This fact alone has limited the ultimate noise and pulsation reduction efficiency of 2- and 4-cycle gas and diesel muffler installations.



To overcome this limiting factor, Fluor Engineers have developed the Fluor Series "D" Muffler System—a scientifically designed muffler *system* wherein work is started on exhaust gases in the immediate proximity of the engine—a muffler *system* that provides all of the advantages of the Fluor Model "T" Muffler *plus* added design features that solve field muffling problems conventional mufflers do not even attempt to solve—and at a cost competitive with conventional single-element mufflers.

A scientific approach to better muffling

The Fluor Series "D" Muffler System incorporates the principle of an acoustical filter consisting of *three* separate, component parts—a primary chamber (A), interconnecting piping (B), and a secondary chamber (C). Element "A" which is located in the immediate proximity of the engine exhaust manifold starts removal of exhaust noise and pulsation at their source. Element "B" is the interconnecting piping which further removes noise and pulsation. Element "C" of the muffling system is located outside the engine room and contains engineered internals that remove the remainder of exhaust noise and pulsation.

Simple installation

In addition to providing the highest muffling efficiency obtainable, the Fluor Series "D" Muffler System needs no redesign or alteration of existing plans for installation in new or old plants. It takes no more space than conventional mufflers—in 95% of cases space requirements are *less* than conventional type mufflers—in 5%, the same as conventional type mufflers.

Available from stock—This revolutionary Fluor Series "D" Muffler System is available with either air-cooled or non-air-cooled features. You need only submit engine room design and dimensions, the make and model of engine and whether the muffling system is to be air-cooled or non-air-cooled. Fluor will recommend sizing and type of installation for your approval. Submit your plans for recommendation and quotation today—no obligation, of course.

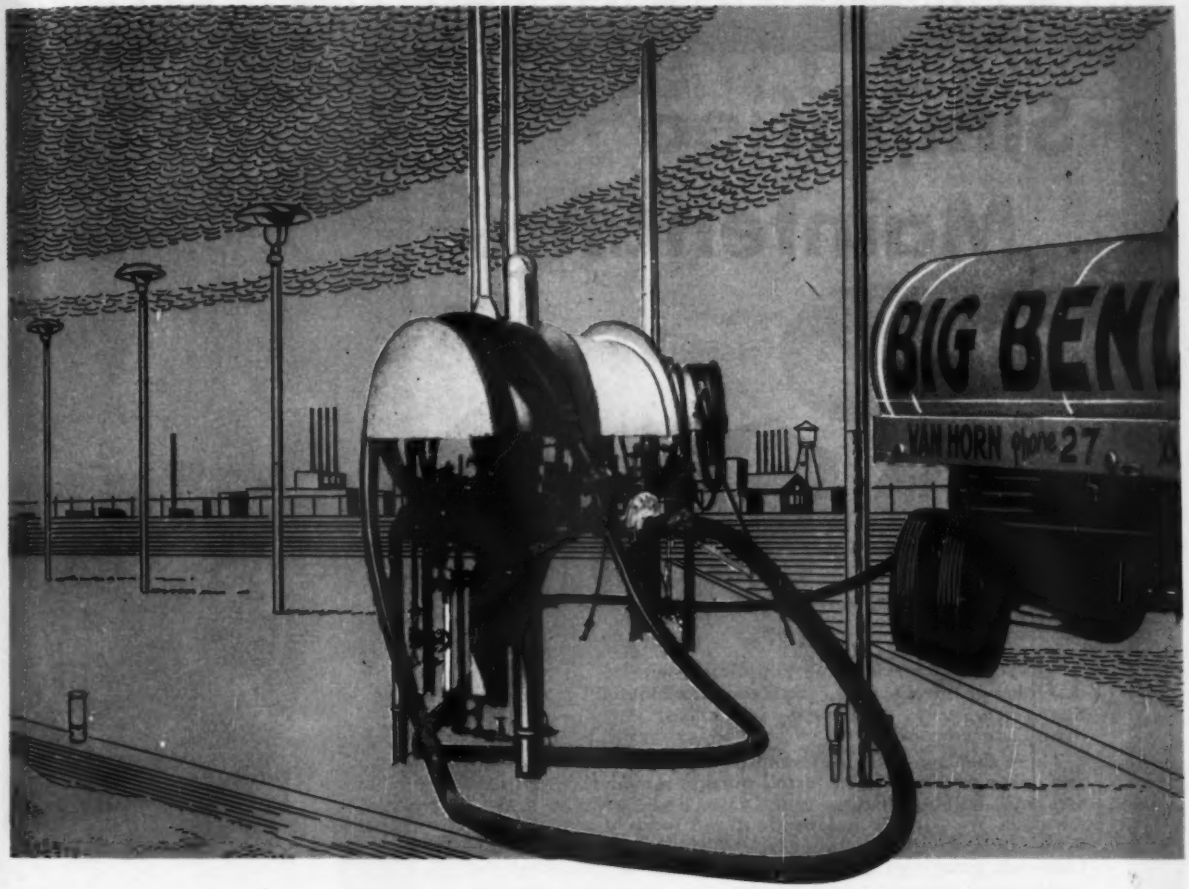
FLUOR

BE SURE WITH FLUOR

DESIGNERS AND CONSTRUCTORS of Refinery, Chemical and Natural Gas Processing Units • *MANUFACTURERS* of Mufflers, Cooling Towers, Fin-Fan Units, Gas Cleaners and Pulsation Dampeners

THE FLUOR CORPORATION, LTD., *Los Angeles 22* • NEW YORK • CHICAGO • BOSTON PITTSBURGH • TULSA • HOUSTON • SAN FRANCISCO

REPUBLIC BUTANE-PROPANE HOSE



HANDLES LP PRODUCTS WITH SPEED AND SAFETY

● Republic's Butane-Propane Hose is an easy-handling, high-pressure carrier especially designed for the transfer of LP products at tank car, truck, and consumer storage sites.

Special features include: A tough, red safety cover, built-in spiralled stainless steel static conducting wire, multiple layers of rubber-impregnated fabric reinforcement and an extremely smooth, diffusion-resistant tube that's compounded to resist both penetrating and deteriorating actions of the liquids even at high pressures.

Republic's Butane-Propane Hose is designed to withstand working pressures up to 350 lbs. with a burst-resistance factor exceeding 1200 lbs. All standard sizes are available in 50-ft. lengths. Factory installed couplings are furnished when specified. Consult your local Republic Distributor or write direct for full facts.

SPECIFICATIONS

SIZE	WORKING PRESSURE	O. D.	WEIGHT 100 FT.
1/2"	350#	1-1/16"	41#
3/4"	350#	1-1/2"	74#
1"	350#	1-13/16"	101#
1-1/4"	350#	2-1/16"	117#
1-1/2"	300#	2-13/32"	149#
2"	275#	3"	221#

Try Republic First

INDUSTRIAL RUBBER PRODUCTS BY

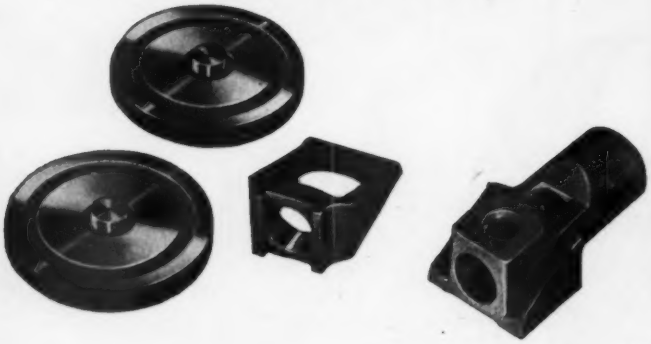
REPUBLIC RUBBER DIVISION

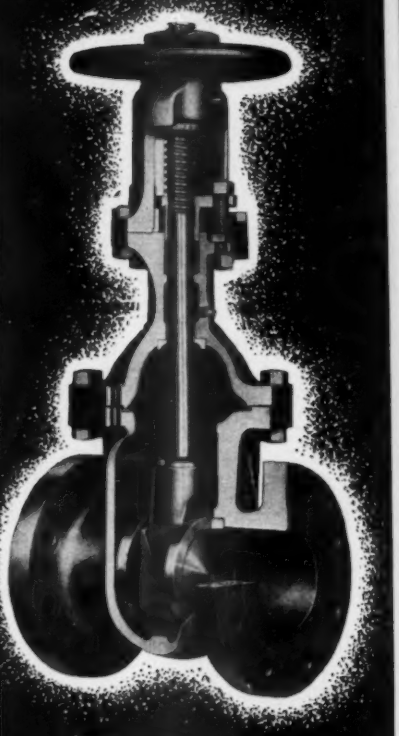
Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

How Darling features prevent trouble and expense

Simplified Maintenance





DESIGNED for extreme simplicity, with all parts interchangeable, Darling Fully Revolving Double Disc Parallel Seat Gate Valves assure easy inspection and unsurpassed maintenance economy.

There they are—just four simple gate parts, two plain discs and two wedges . . . readily and quickly removed or replaced as a unit, without disturbing the valve body. Moreover, since the discs are entirely independent and interchangeable, new discs can be installed without laborious bench work or fitting. Likewise, seat rings are made with lugs for easy removal and replacement without removing the valve body from the line.

Extra deep stuffing boxes provide ample packing space. Independent gland bolts permit adjustment or replacement of packing without disturbing the stuffing box bolts.

Finally, *all* Darling Gate Valve parts are made to established engineering standards, beginning with rigid metallurgical specifications, then controlled all along the way with gauges and templates for complete dimensional accuracy.

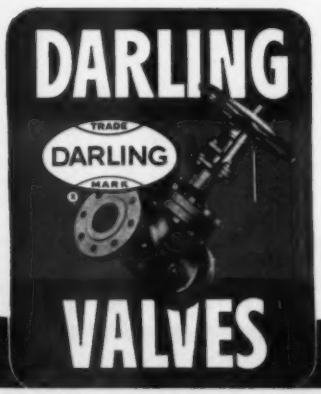
So for low maintenance cost and minimum parts inventory, for long-range economy in *every* way, specify Darling Fully Revolving Double Disc Parallel Seat Gate Valves.

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

*This advertisement is one of a series showing how the unique Darling Fully Revolving Double Disc Parallel Seat Gate Valves answer the following critical operating problems:

- Positive, easy closing—regardless.
- Automatic adjustment for valve body distortion.
- Elimination of disc-to-seat friction and galling.
- Uniform wear distribution.
- Extreme simplicity.
- Greater service life.
- Simplified maintenance.



Outline your service requirements and get complete information on Darling Valves of the proper type. Or, send for the complete 300-page Darling Catalog No. 17M. It describes Darling Valves of all *types for every normal or unusual service, and for pressures up to 1500 pounds. It's full of helpful information . . . Yours for the asking.*

CORROSION RESISTANT VALVES

In addition to conventional iron, bronze and steel constructions, Darling specializes in valves for any corrosive fluid: iron body valves with special alloy trim; iron body, rubber lined, with special alloy trim; all bronze; and all special alloy. Darling's 50 years of experience in meeting unusual requirements is always at your service.

THE VALVE MARK OF QUALITY . . . WATCH FOR IT

WIRE ROPE

You get extras in Roebling Preformed Rope . . . extra toughness . . . extra life

YOU PAY FOR THE BEST when you buy wire rope. And you *get the best* when you buy Roebling Preformed "Blue Center" Steel Wire Rope. "Blue Center" steel is an exclusive Roebling product . . . gives rope the extra toughness that spells long life . . . service economy that really counts. Besides that, Roebling Preformed always spools better . . . reduces vibration and whipping . . . doesn't tend to set or kink.

Roebling makes a wide range of wire rope . . . brings you the right construction, grade and size for top performance and economy on each installation. Have your Roebling Field Man help select the *best* rope for your particular requirements. And for maximum savings, get his suggestions on the proper use and maintenance of wire rope. He knows the case histories of thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

DISTRIBUTED BY THE NATIONAL SUPPLY COMPANY
REPUBLIC SUPPLY COMPANY

P&H DIESEL ENGINES

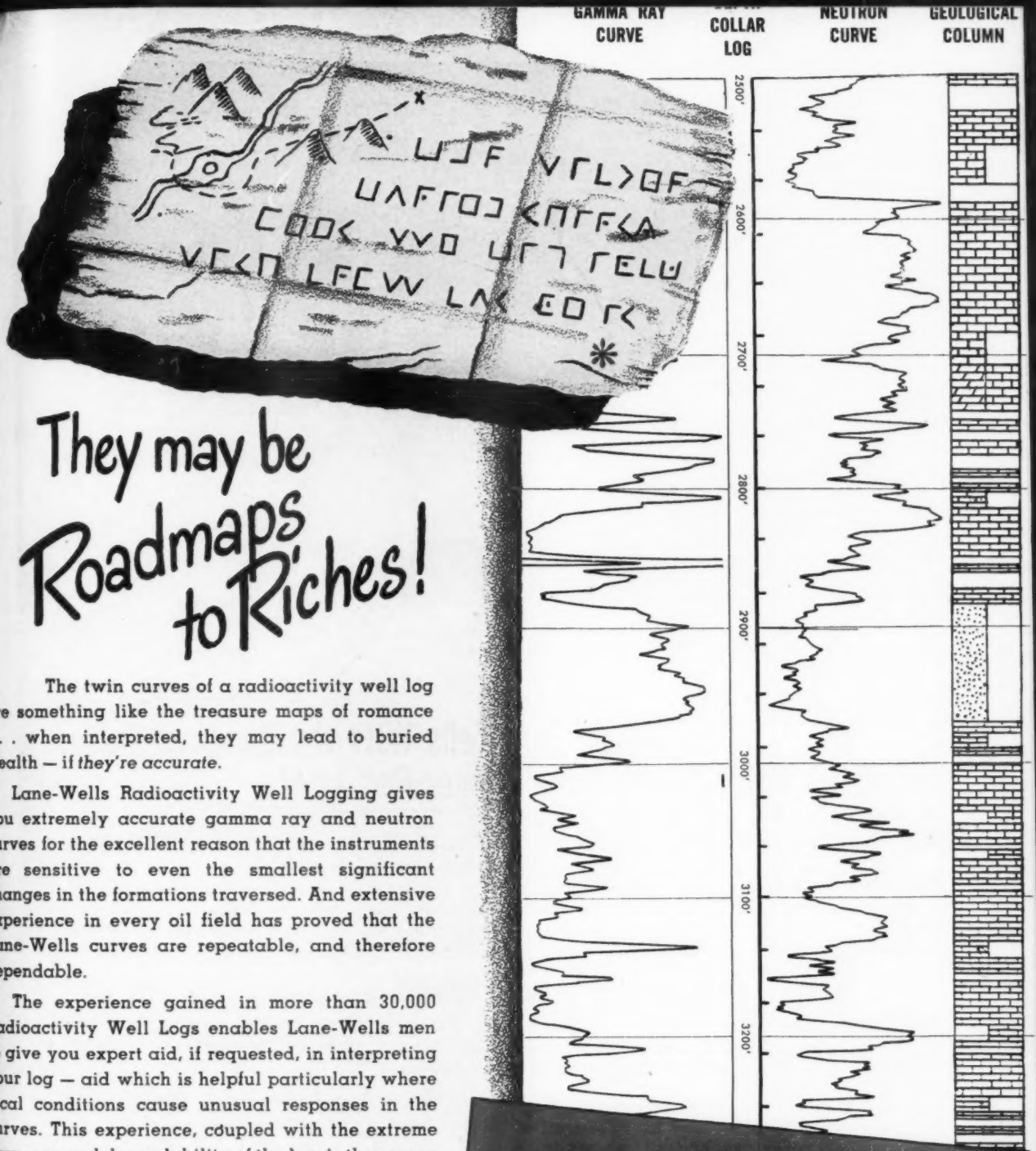
2-CYCLE

FEWER PARTS

MEAN FEWER TROUBLES FOR YOU

You'll like the way so many parts have been designed *out* of P&H Diesels. It makes them simpler, more dependable for all types of service. It makes them easier to understand, easier to service. It lets you cut parts inventory — and costs, too! It's another important reason why experienced users are switching to P&H Diesels . . . *standardizing on them.* Five models: 1, 2, 3, 4, and 6-cyl. For literature, write P&H Diesel Division, Harnischfeger Corporation, Port Washington, Wisconsin.

P&H DIESEL DIVISION
HARNISCHFEGER
PORT WASHINGTON P&H WISCONSIN, U. S. A.



They may be Roadmaps to Riches!

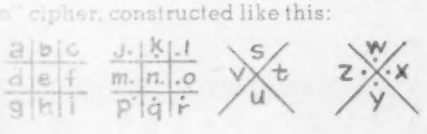
The twin curves of a radioactivity well log are something like the treasure maps of romance . . when interpreted, they may lead to buried wealth — if *they're accurate.*

Lane-Wells Radioactivity Well Logging gives you extremely accurate gamma ray and neutron curves for the excellent reason that the instruments are sensitive to even the smallest significant changes in the formations traversed. And extensive experience in every oil field has proved that the Lane-Wells curves are repeatable, and therefore dependable.

The experience gained in more than 30,000 Radioactivity Well Logs enables Lane-Wells men to give you expert aid, if requested, in interpreting your log — aid which is helpful particularly where local conditions cause unusual responses in the curves. This experience, coupled with the extreme accuracy and dependability of the log, is the reason why most experienced operators agree that, in either cased or open hole, you'll get the best results with

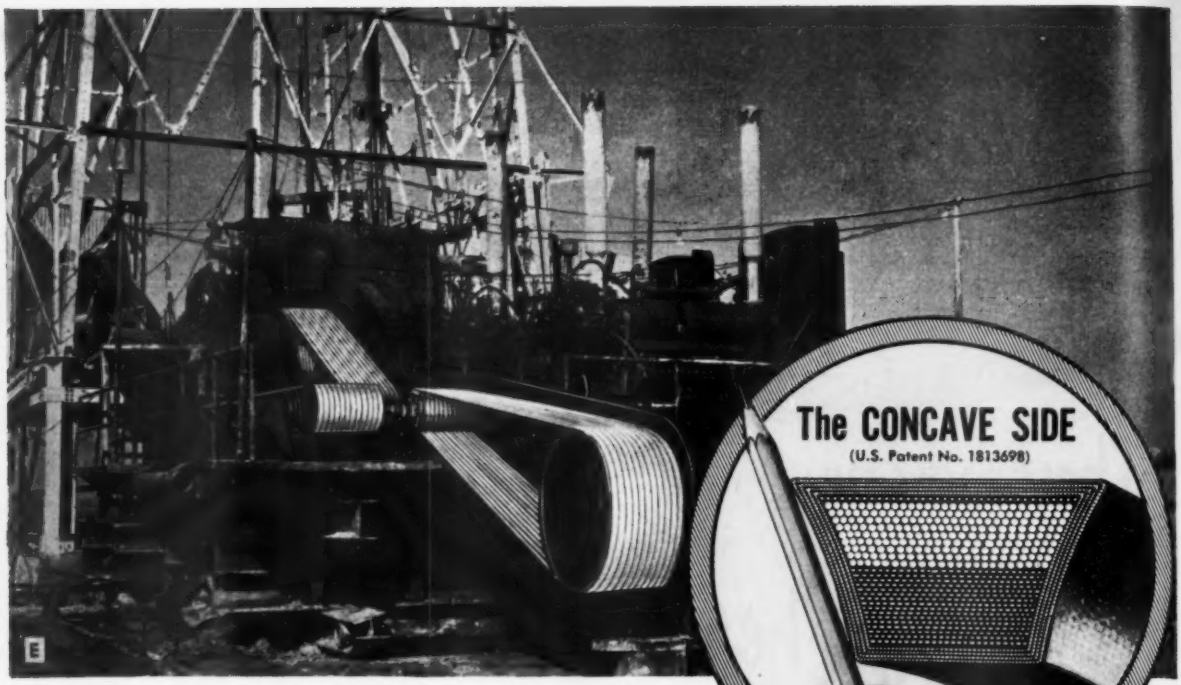
LANE WELLS
Radioactivity Well Logging

*This message is written in the once-popular "pig-pen" cipher, constructed like this:



General Offices, Export Office and Plant • 5610 So. Soto St. Los Angeles 58, California

Los Angeles • Houston • Oklahoma City
Lane-Wells Canadian Co. in Canada
Petro-Tech Service Co. in Venezuela



"These Vulco Rope Drives have lasted through the drilling of seven wells of over 6,300 feet each," says John Rundle, tool pusher for Loffland Brothers, the operators of this big mechanical rig.

This Simple Test Tells WHY the Concave Sides of Gates Vulco Ropes Mean *Longer Belt Life!*

Prove this *yourself*—in two minutes' time.

Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

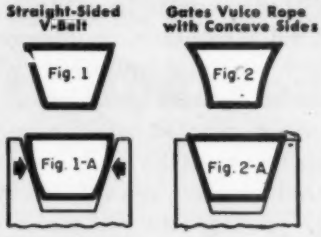
Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure that you get the V-belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

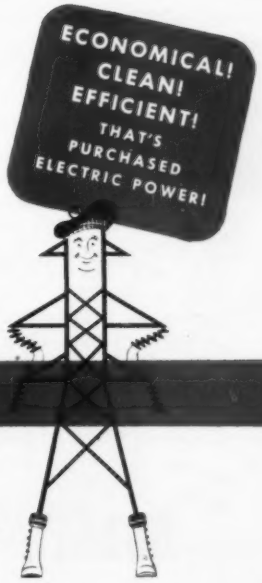
CS-511

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

Gates VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

IT'S POWERED BY *Electric Power*

This clean, modern pipe line terminal near Houston, Texas, is another example of PURCHASED Electric Power efficiency and economy. Hundreds of similar installations now help to keep the nation's expanding pipe line systems operating with less manpower and at lower costs during these inflationary times. While there's a chance to save thousands — perhaps millions of dollars — don't decide until you have fully investigated the more efficient, low cost advantages of PURCHASED Electric Power!



Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

OR ADDRESS YOUR REQUEST TO P. O. BOX 131, DALLAS, TEXAS

ANNOUNCING!

NEW DODGE "Job-Rated" TRUCKS

The trucks that do the most for you!

NEW Greater Power! Eight engines—with horsepower increases as high as 20%. You'll enjoy the *right power* for your job! *With all their extra value, Dodge "Job-Rated" Trucks are priced with the lowest!*

NEW Easier Handling! Now, even sharper turning! More comfortable steering angle and easier-operating new worm-and-roller steering gears! You also get such proved features as cross-steering, wide front tread, short wheelbase.

NEW Interiors! Striking new, massive appearance—inside and out! Lower hood line for better visibility. Attractive two-tone cab interiors. New clear-vision instrument panel. New seat comfort.

NEW Extra Quiet Brakes! Another Dodge "first"! Molded, tapered Cyclebond brake lining. Practically eliminates squeal and grab. Extra-smooth, positive action. Extra-long life. Standard on trucks 1½-ton and up, except air brake models.

MORE THAN 50 BRAND-NEW IMPROVEMENTS . . . INCLUDING

- NEW! SMOOTHER RIDE
- NEW! EASIER LOADING
- NEW! EASIER BAD-WEATHER STARTING
- NEW! GREATER ELECTRICAL CAPACITY
- NEW! EASIER-TO-READ INSTRUMENTS
- NEW! BETTER VISIBILITY IN BAD WEATHER
- NEW! MORE EFFICIENT FUEL PUMP

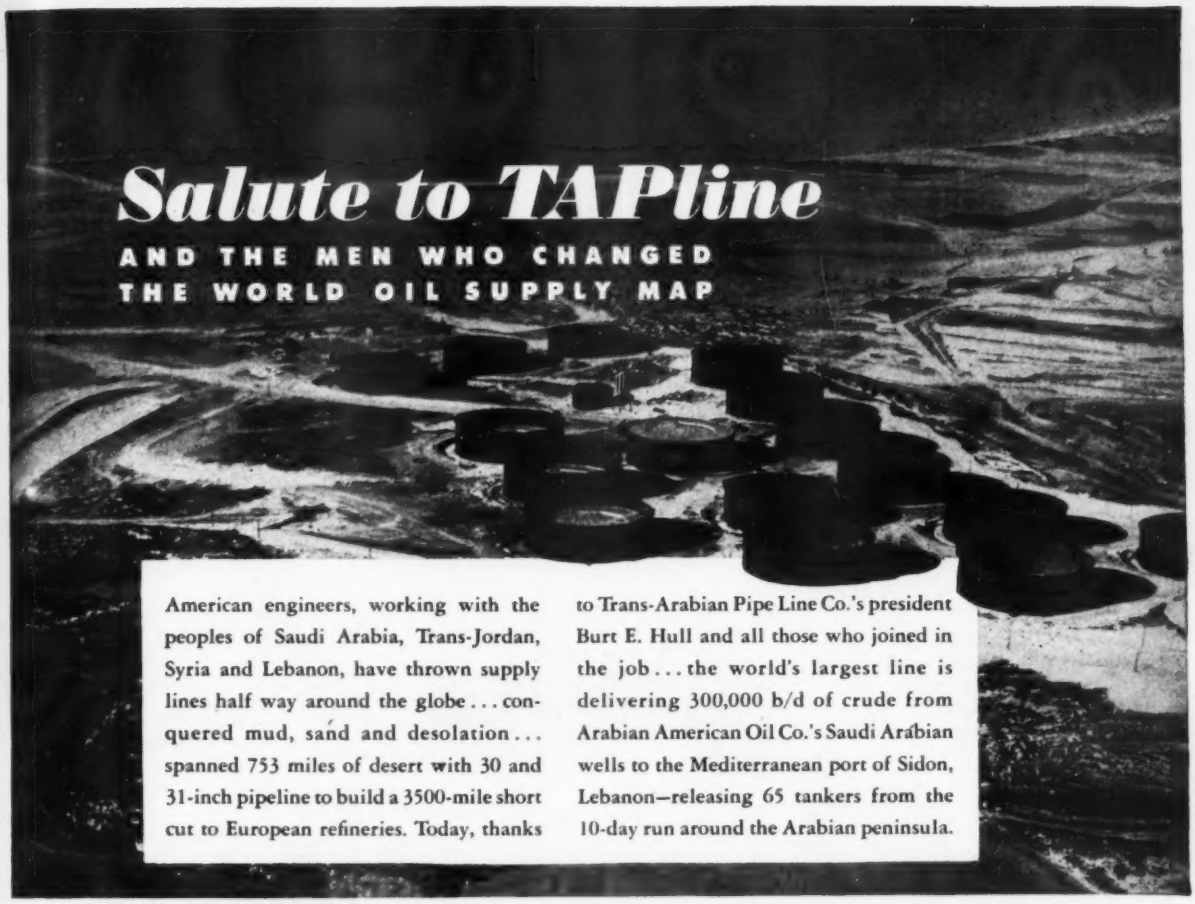
ANOTHER DODGE EXCLUSIVE! gyrol fluid drive now available on ½-, ¾-, and 1-ton models.

See the NEW **DODGE Job-Rated TRUCKS on display at your dealer's SATURDAY, FEBRUARY 10th**

XUM

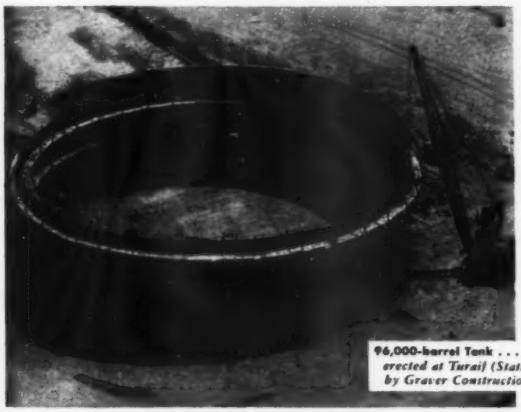
Salute to TAPline

AND THE MEN WHO CHANGED THE WORLD OIL SUPPLY MAP



American engineers, working with the peoples of Saudi Arabia, Trans-Jordan, Syria and Lebanon, have thrown supply lines half way around the globe . . . conquered mud, sand and desolation . . . spanned 753 miles of desert with 30 and 31-inch pipeline to build a 3500-mile short cut to European refineries. Today, thanks to Trans-Arabian Pipe Line Co.'s president Burt E. Hull and all those who joined in the job . . . the world's largest line is delivering 300,000 b/d of crude from Arabian American Oil Co.'s Saudi Arabian wells to the Mediterranean port of Sidon, Lebanon—releasing 65 tankers from the 10-day run around the Arabian peninsula.

Looking Westward to the Mediterranean Sea . . . *at Sidon where Graver Construction Co. erected terminal tankage of nearly three million barrels.*



96,000-barrel Tank . . . *erected at Turaif (Station 6) by Graver Construction Co.*

What Graver Did to Help Move Arabian Crude Closer to Europe

More than 100 Graver engineers with a host of Graver-trained Arab workmen built the entire facilities for Station 6, Turaif—including the pump house and installation of all machinery, erection of a 96,000-barrel tank, and housing and other accommodations for a complete town of 1,000 people. At the Sidon terminal Graver Construction Co. erected sixteen 180,000-barrel tanks.

GRAVER CONSTRUCTION CO.

332 S. MICHIGAN AVENUE, CHICAGO

NEW YORK • JERSEY CITY • HOUSTON

A DIVISION OF

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, IND.

Pump House at Station 6, Turaif . . . *built by Graver Construction Co.*

XUM

Now there's a true Light-Duty Four Wheel Drive FOR GEOPHYSICAL WORK

A new LD equipped as water carrier with special winch rig mounted on front

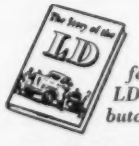
14,500 lbs. Gross Vehicle Weight
At last there is a *true* four-wheel-drive for the largest segment of the over-all truck field! The LD, born from FWD's unmatched experience in four-wheel-drive development, answers a great demand.

A *True* Four-Wheel-Drive Does *This!*
The only way to gain safety, economy and widened operation with a four-wheel-drive is to have proper distribution of load and power. FWD, alone, delivers those major advantages for this work-range.

The LD Has a *True* Truck Engine!
Only a *real* truck engine can give you peak efficiency for all the work demanding the LD. This efficiency creates on-the-job advantages, longer engine life and attractive savings in gas and oil.

FWD LIGHT-DUTY model fills important truck-transport gap in the oil production field

If "oil is where you find it"— the LD is a better, more economical answer to your problem of getting what you need where you want to take it. You'll find the LD is factory engineered to easily do those tough jobs that *conventional* trucks and *conversions* have tried to serve. Whether it's mounting drill rigs, providing a firm safe mounting for geophysical instruments — or hauling water or explosives — the LD completely fills the need for a powerful, sure-to-get-there, moderately-priced, light-duty FWD.



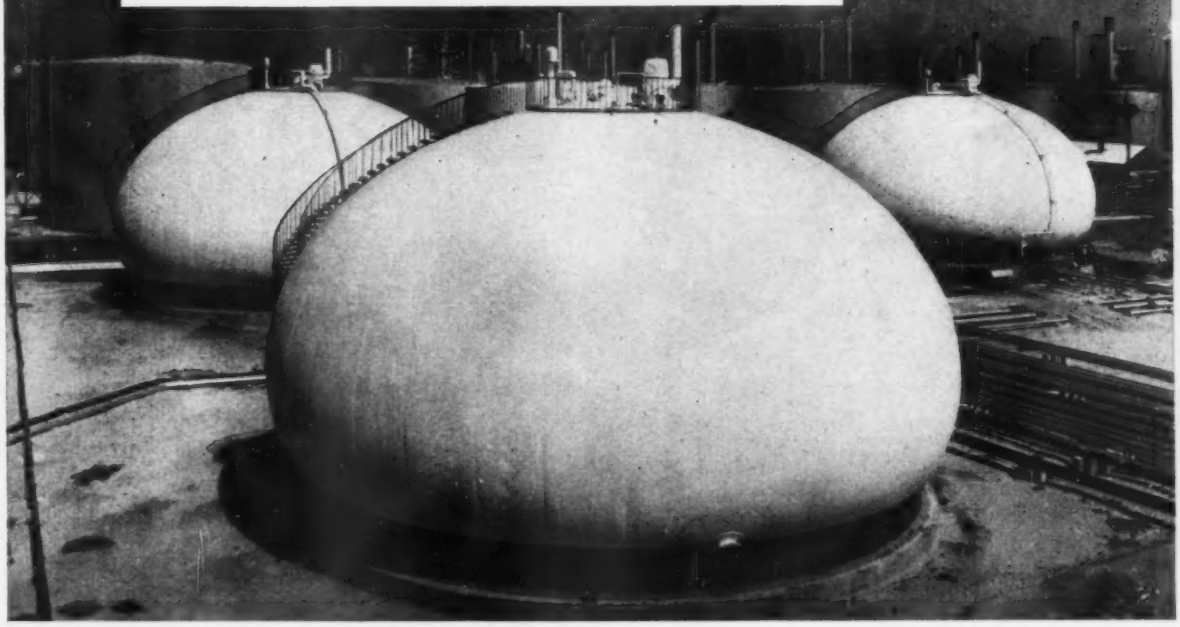
GET ALL THE FACTS *on the LD! Ask for this folder, "The Story of the LD". See your FWD distributor or write FWD.*

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ont.
World-Wide Sales and Service

Built by the Makers of America's Foremost Heavy-Duty Trucks

For Efficient and Economical Protection — Use . . .

PITTSBURGH TANKHIDE!



PAINT protection that really lasts—that's what you get when you use Pittsburgh TANKHIDE for your major tank and structural steel painting requirements.

● **TANKHIDE** primers and finishing coats have been used most satisfactorily for many years in all sections of the country to protect millions of tons of iron and steel structures, equipment and machinery.

● **The combination** of intensely white Titanium pigments in weather-resistant synthetic vehicles has made Synthetic White Tankhide a durable, long-lasting metal protective paint.

● **Its high heat** and light reflection characteristics prevent the excessive heat absorption that brings about evaporation waste. Not only is this low evaporation loss maintained but its brilliant white appearance lasts because of TANKHIDE'S unique self-cleaning action.

● **With proper spray** manipulation, Synthetic White TANKHIDE will hide thoroughly with one coat. Satisfactory hiding can also be obtained by careful brush application where spraying is not possible.

● **Pittsburgh offers** a complete line of protective coatings for every need in the petroleum industry—production and refinery finishes for towers, pipe lines, buildings and equipment; METALEAF Aluminum Paints; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes to the petroleum industry can be helpful and even save you time and money!

• • •

PITTSBURGH PLATE GLASS COMPANY

Industrial Paint Division, Pittsburgh, Pa.

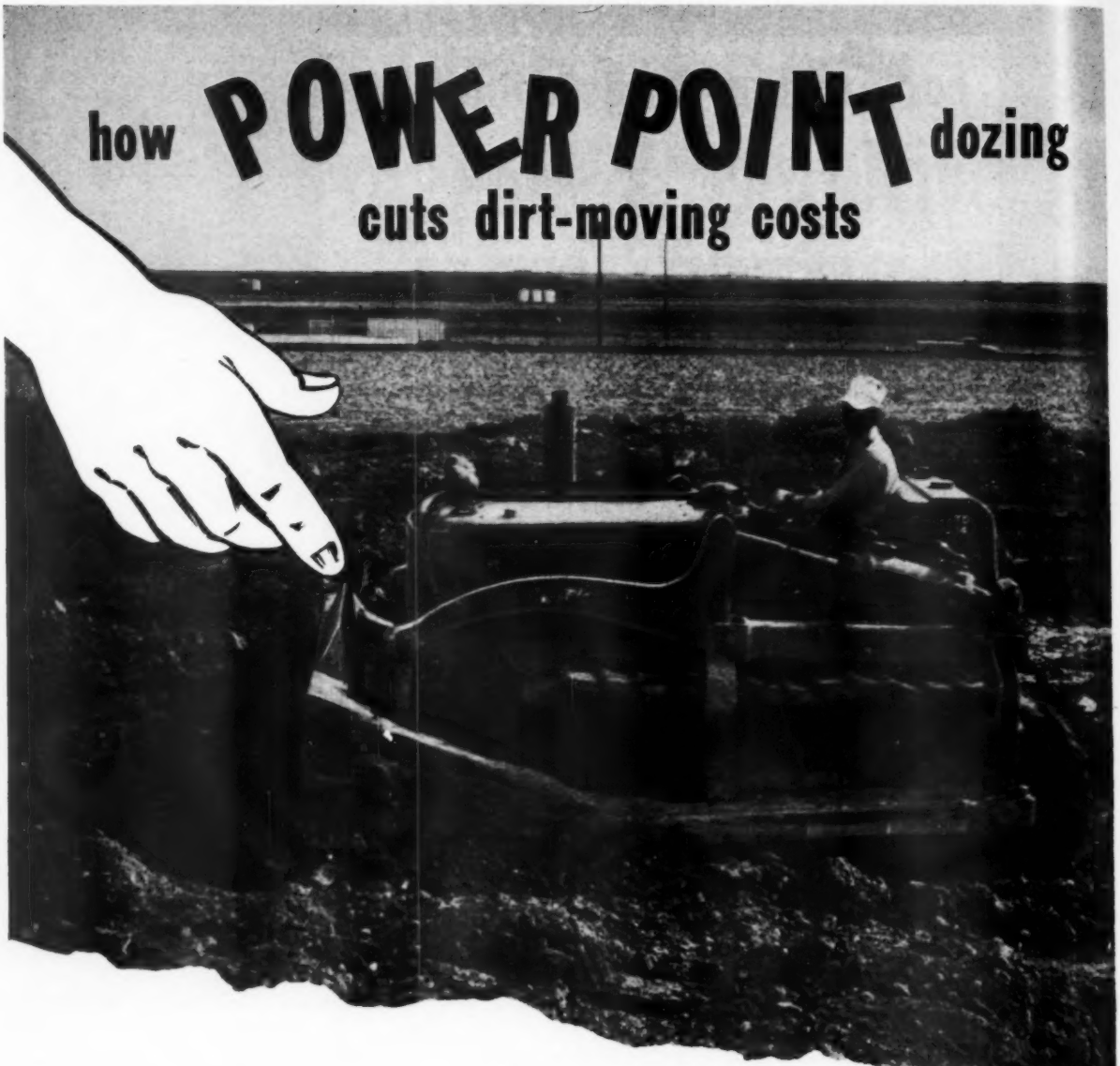
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PPG **PITTSBURGH** *Industrial* **FINISHES**

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

how POWER POINT dozing cuts dirt-moving costs



BUCYRUS-ERIE Bulldozers and Bullgraders are so exactly matched and balanced to International Crawler tractors that *power* is concentrated right at the *point* where it belongs — the blade. Thus by making the most of the tractor's pushing force, Bucyrus-Erie rigs deliver maximum output per tractor horsepower. And Bucyrus-Erie blades are designed to make the most of this concentrated power. They're scientifically curved to keep dirt alive and rolling — the quickest, easiest way to move a load. The result is greater yardage per gallon of fuel used, lower operating costs.

But big yardage isn't the only saving. By balancing the dozer to the tractor, working strains and stresses are absorbed by parts built to take the load. The result is fewer repairs, less down time, lower maintenance cost.

Your nearby International Industrial Tractor distributor can give you many more reasons why Bucyrus-Erie Bulldozers and Bullgraders are your best bets on the lease. See him for full details.

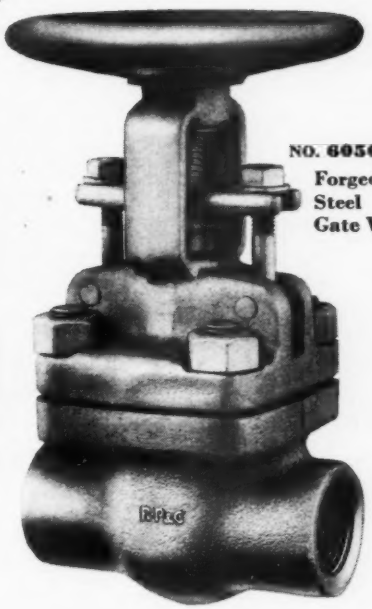
BUCYRUS ERIE

BUCYRUS-ERIE COMPANY, SOUTH MILWAUKEE, WISCONSIN

257T51

See Your INTERNATIONAL INDUSTRIAL TRACTOR Distributor

R·P&C VALVES



NO. 6056
Forged
Steel
Gate Valve

Here is a Premium Valve that is NOT premium priced

CHECK THESE DESIRABLE FEATURES:

- Bolted bonnet construction
- Heat-treated and hard chrome plated stainless steel wedge
- Stainless steel gland eye-bolts and nuts
- Two-piece gland and follower
- Tongue and groove bonnet joint

It's well designed. It's low priced in its field.

See your R-P&C distributor or write nearest R-P&C district office.

ACCO

Reading, Pa., Atlanta, Baltimore, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

R-P & C VALVE DIVISION
AMERICAN CHAIN & CABLE

"Intentionally Better"
READING-PRATT & CADY VALVES

Two of several wool bins in the Hardwick and Magee Spinning Mill—built with K&M APAC.

ON GUARD: K&M "Century"® APAC

When raw wool or processed wool is stored in bulk, there's danger of fire—not only from external causes, but also from spontaneous combustion. That's one of the reasons the Hardwick and Magee Company, nationally known carpet and rug manufacturers, chose K&M APAC for the construction of these wool bins in their modern spinning mill.

K&M APAC—specially processed sheets of asbestos-cement—resists fire effectively and dependably. The smooth, hard finish of APAC prevents fibrous matter and dust from adhering to the surface—reduces materially the opportunity for fire to spread. And K&M APAC stops the other enemies of raw materials, also—weather, rust, rot, termites, and rodents can't affect it.

You'll like the installation economies you get from using K&M APAC, too. Sheet sections are large (4′ x 8′) and strong, but not bulky; they handle easily, can be cut and fitted on the job, are quickly erected. And you save on maintenance costs, too, for K&M APAC doesn't need even paint to preserve its attractive finish.

It will pay you to consider K&M APAC Asbestos-Cement Sheets for such needs as panels, partitions, sheathing, shaft casings, bins, in fact, for all flat surfaces both interior and exterior. APAC can be applied over insulation boards, wood studs, solid wood sheathing, steel or wood girts. It's adaptable and economical—the perfect answer to flat surface covering problems.

GET THE COMPLETE STORY—write us for details and the name of your nearest distributor. There's no obligation, of course.

Nature made Asbestos... Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

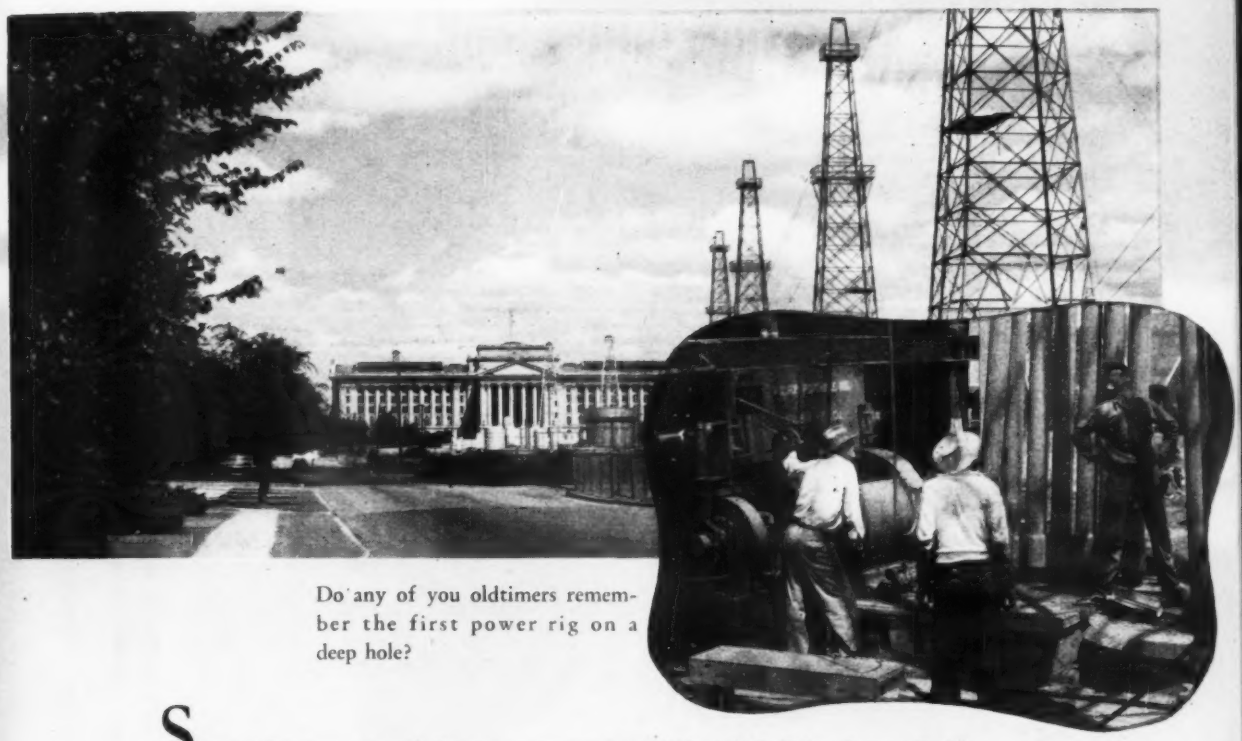
K&M best in asbestos®

Write
inform
Torcair

XUM

REMEMBER

THE CAPITOL GROUNDS AT OKLAHOMA CITY?

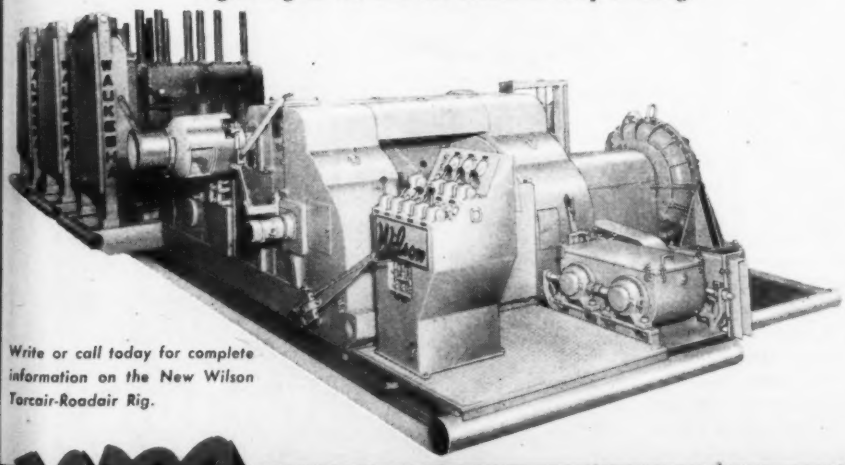


Do any of you oldtimers remember the first power rig on a deep hole?

Sooner Senators stared. Steam supporters scoffed. Oil, Politics, Steam Drilling and Power Rigs got hopelessly mixed. That puny little power rig could never drill so deep. Steam was safe! But Wilson changed all that!

Wilson Was There! Wilson Was First!

The building in the background is the Oklahoma State Capitol surrounded by many wells which are still producing today. The first power drilling rig in the Oklahoma City Field was the one shown above (inset). It was the beginning of the end for steam in deep drilling.



Write or call today for complete information on the New Wilson Torcair-Roadair Rig.

ANOTHER WILSON FIRST! The all new WILSON TORCAIR-ROADAIR RIG—the world's first rig to be designed for TORQUE CONVERTER DRIVE OR DIRECT ENGINE DRIVE (at left). Completely new — from front to rear. It can be transported in one unit, or can be broken down into several smaller units. It contains Wilson Air-Tube Disc Clutches throughout, Full Pressure Water Cooled Brakes, and many other outstanding features, including the sensational Wilson Sectional Box Type compound. The only rig with four Air Clutch Speeds on the Drum that can be changed while running — and under any load.

Wilson MANUFACTURING CO., Inc.
WICHITA FALLS, TEXAS

XUM

NOW ON MORE THAN 3000 TREES . . . BECAUSE

O-C-T "JE" FLOW CONTROLS GIVE MORE FOR YOUR MONEY

When you can buy ***one piece of equipment at half the price*** that performs all the functions and takes the place of seven fittings in a conventional Christmas Tree wing, you certainly are getting more for your money. And that's exactly what O-C-T "JE" Flow Controls offer you ***without sacrificing safety or performance.***

Yes, this compact, easy-operating O-C-T "JE" Flow Control Unit . . . adaptable to either positive or adjustable chokes . . . performs the functions and takes the place of a wing valve, Christmas Tree cross or tee, adjustable or positive choke and the upper bottom hole pressure connection adapter. Besides, it eliminates the flange connections between the tee and the bottom hole test adapter, between the tee and the wing valve and between the wing valve and the choke. Thus, when used in place of a 10,000 lbs. test conventional wing, the O-C-T "JE" Flow Control Unit effects a cost saving ranging as high as 90%. In addition, it reduces weight as much as 70%, provides quick wing valve replacement, greater ease of operation at high pressures and easy field maintenance.

So don't be handicapped by habit. Investigate all the advantages and tremendous savings this remarkable O-C-T "JE" Flow Control offers you. Write today or ask your O-C-T Representative for details. O-C-T equipment is available through recognized supply stores.

Oil Center Tool Co.

P. O. Box 3091, Houston, Texas

Canada — Canadian Western, Montreal, Quebec

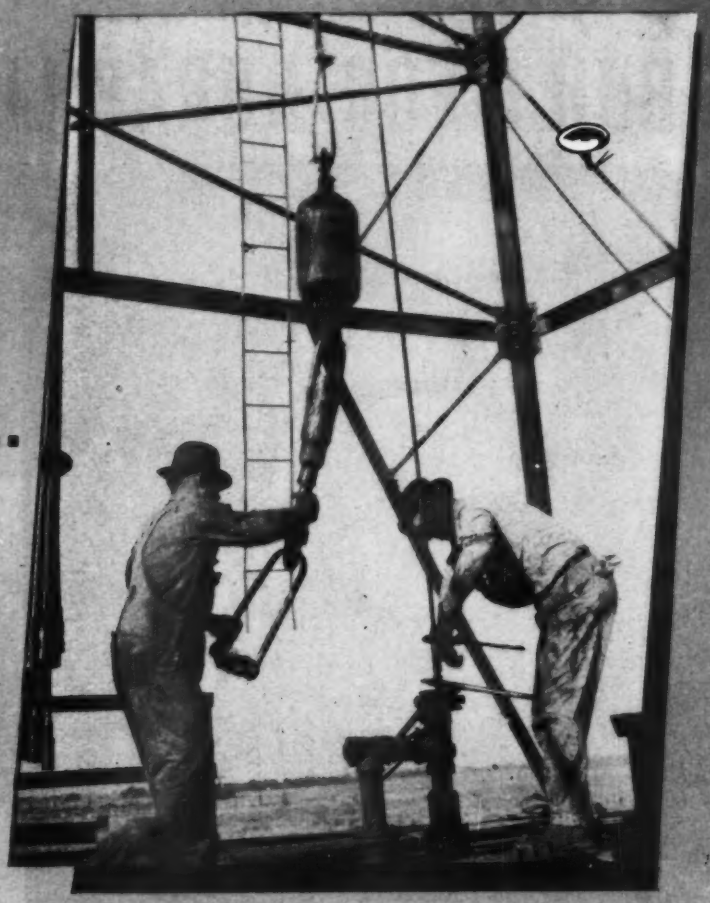
Drilling Areas — La Grand, Sunset & Coll, Lake Maracaibo, Middle East, Portugal, Algeria, Egypt for Ad Dakar, Casablanca

P. O. Box 2071, Houston 1, Texas

POINT NO. 2

EVERY JONES SUCKER ROD...

is a quality product. A comparison of threads and make-up spotlights the outstanding superiority of the *Jones Joint.*



LOOK FOR THE GREEN RODS!

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Best in the Field!

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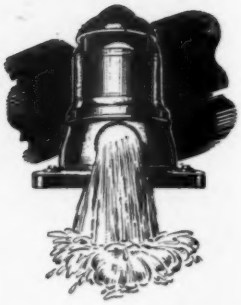
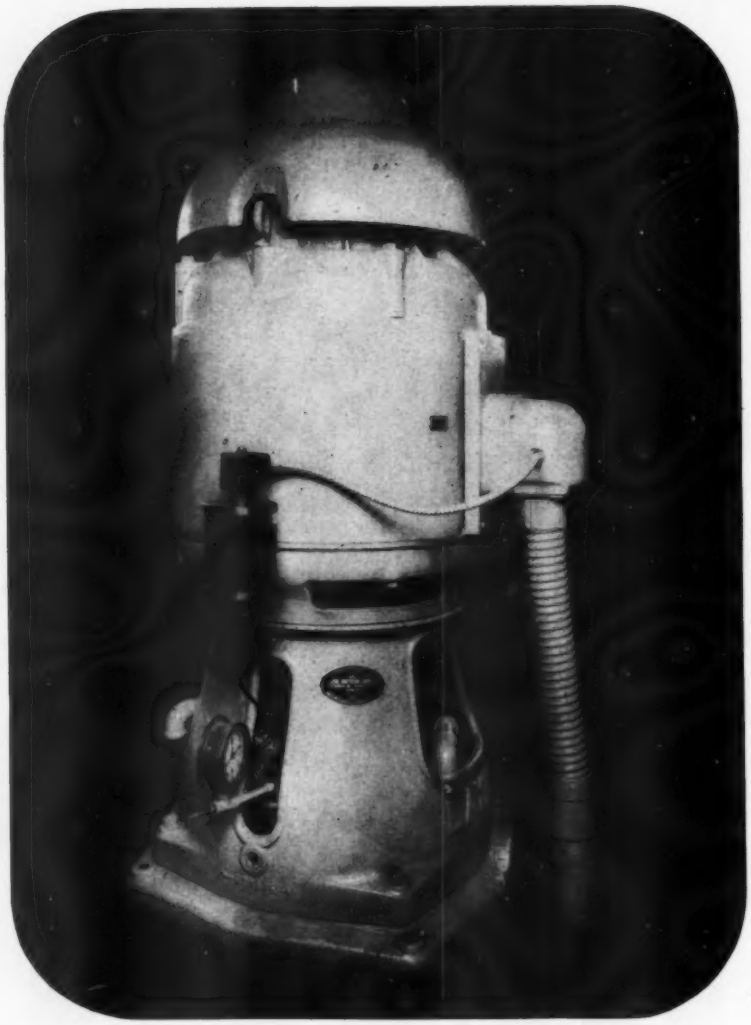
Every Inch
BUILT FOR DURABILITY





LAYNE OFFERS a wide range of fully illustrated catalogs and folders describing Layne Well Water Systems, Oil and Water Lubricated Vertical Turbine Pumps, Short Coupled Service Pumps, Cemented Water Wells, Irrigation Pumps, etc. Sent without obligation.

ALL Layne Well Water Systems are designed and built to give many years of durability,—and that durability extends into every part from motor base to well screen. Once installed according to Layne's own exclusive methods, these ground water supply systems have a record for giving extraordinary satisfaction over extremely long periods of time. This means that as an investment, Layne Well Water Systems always more than justify their cost.

Layne knows that without durability, all of their fine designing and high efficiency features would be lost. As the world's most widely experienced builder of ground water supply equipment, Layne knows what it takes to create durability.

Layne designs and builds complete well water systems, drills the wells and installs pumps to produce ground water for any purpose, — cities, factories, processing plants, etc. No charge is made for their study and recommendations.

For further information, catalogs, etc., address

LAYNE & BOWLER, INC.

General Offices Memphis 8, Tenn.

Layne

WELL WATER SYSTEMS

VERTICAL *Turbine* PUMPS

LAYNE ASSOCIATED COMPANIES

ASSOCIATED COMPANIES—Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Wash. ★ The Layne-Texas Co., Ltd., Houston, Tex. ★ Layne-Western Co., Kansas City, Mo. ★ Layne-Minnesota Co., Minneapolis, Minn. ★ International Water Corp., Pittsburgh, Pa. ★ International Water Supply, Ltd., London, Ont. ★ Layne-Hispano Americana, S.A., Mexico, D. F. ★ General Filter Company, Ames, Iowa.

Hard-to-hold

LPG

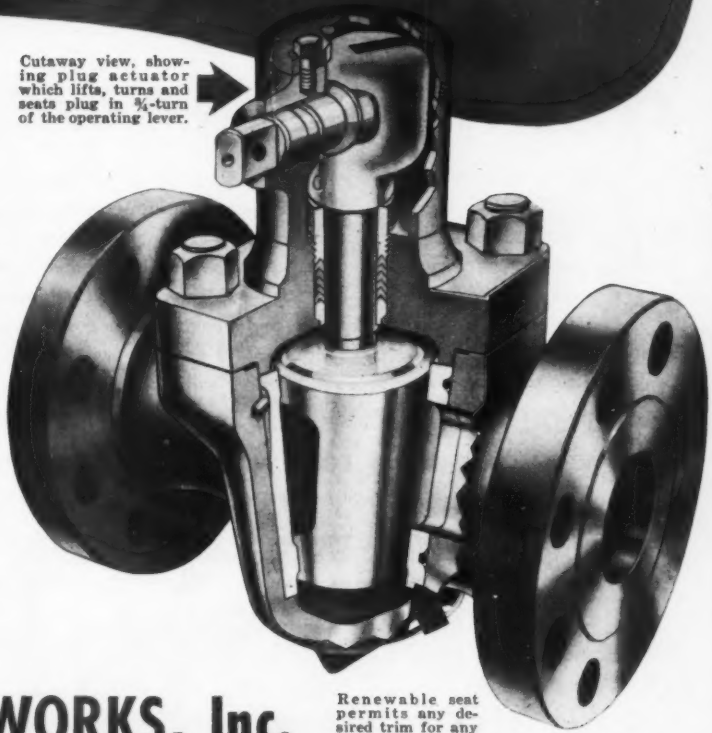
is an easy assignment for this

Cameron NON-LUBRICATED LIFT-PLUG VALVE

Liquefied Petroleum Gases, such as butane and propane, are rough on ordinary valves . . . particularly those valves which depend on a lubricant for a tight seal. These light hydrocarbons have an affinity for valve lubricants, and once the lubricant is dissolved by the butane or propane, the line product is not only contaminated but the valve no longer effects a shut-off.

LPG is one of a number of difficult services where Cameron NON-LUBRICATED Lift-Plug Valves have turned in an outstanding performance. This valve is unique in that its seat is separate from the valve body. Line pressures tend to improve rather than destroy the geometry of the fit between the seat and plug. Obviously, the separate seat feature permits any desired trim. And, the valve may be completely overhauled without removing it from the line.

Send today for literature on this truly remarkable valve. It may be the answer to *your* valve problem, too!



Cutaway view, showing plug actuator which lifts, turns and seats plug in ¼-turn of the operating lever.

Renewable seat permits any desired trim for any special service; also facilitates field repair and minimizes maintenance.

CAMERON IRON WORKS, Inc.

P. O. BOX 1212 HOUSTON, TEXAS

EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.

MARKS THE SPOT

where you need these proved

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CEMENT CONTAMINATION

Several times during the drilling of every well cement contamination of mud becomes a problem. These Magcobar Products have been proved effective for pre-treating the mud prior to drilling the cement and restoring the desirable drilling qualities to cement-cut mud. When you encounter cement contamination, use these Magcobar materials . . . separately or in combinations . . . to save rig time and money and eliminate the costly practice of discarding cement-cut mud. Your Magcobar field engineer will gladly give assistance at the rig and there are nearly 300 strategically located Magcobar dealers with stocks of these products, ready to serve you day and night.

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Complete

DRILLING MUD SERVICE

DEALER

—a protective colloid and powerful dispersing agent—an excellent pre-treatment for conditioning mud prior to drilling cement.

—a complex phosphate for chemically removing cement contaminants.

—an all-purpose mud-treating chemical which supplements phosphates in reconditioning cement-contaminated mud.

—a concentrated colloidal additive for restoring the viscosity and wall-building characteristics.

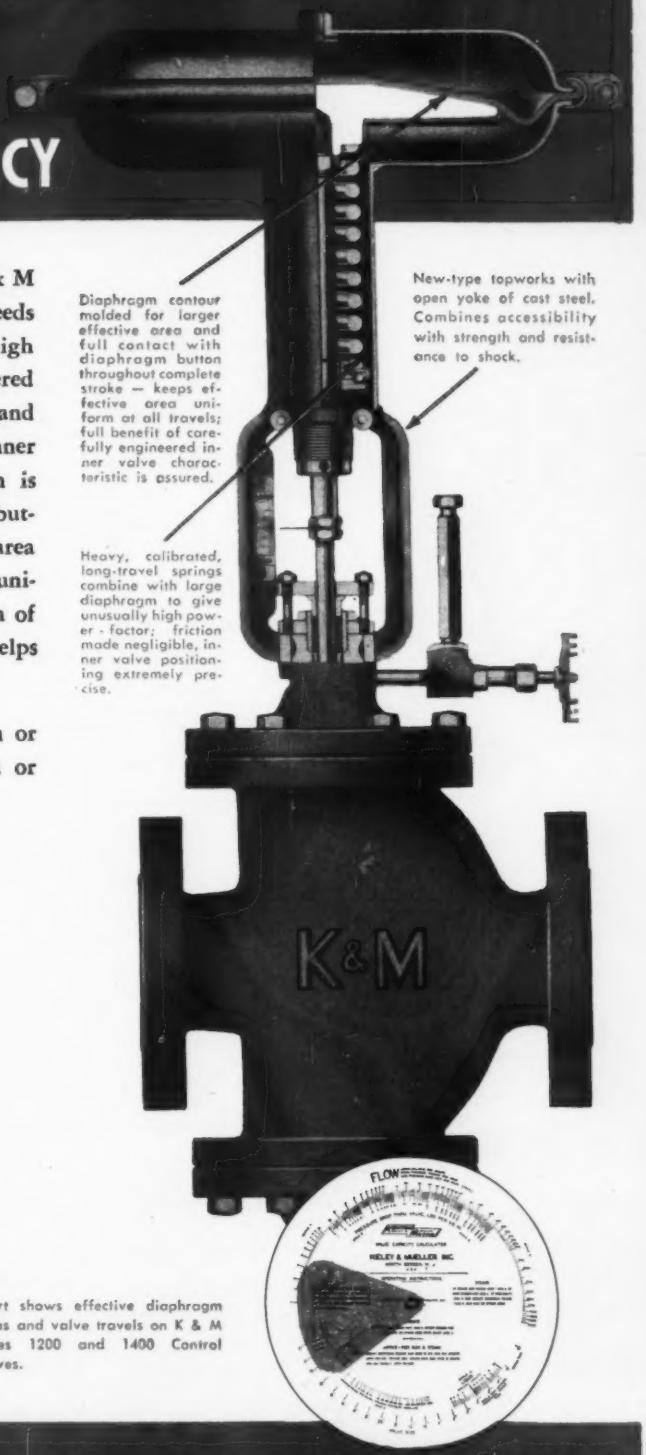
—a ready-mixed mud in dry form which is resistant to salt and cement contaminants.

K&M The Control Valves with

GREATER POWER for GREATER ACCURACY

The Diaphragm Motor of the far-advanced K & M Control Valve is designed for the more exacting needs of modern process industries. An unusually high power-factor is obtained by the carefully-engineered relationship of large effective diaphragm area and heavy, calibrated spring; friction is negligible, inner valve positioning more precise. The diaphragm is specially designed for constant affinity with the button contour; this assures a uniform effective area throughout the complete valve stroke, thus more uniformly accurate control. The unusually large area of the diaphragm in relation to the valve size also helps assure more precise control.

K & M motors are available for direct action or reverse action without change in effective area or stroke.


Diaphragm contour molded for larger effective area and full contact with diaphragm button throughout complete stroke — keeps effective area uniform at all travels; full benefit of carefully engineered inner valve characteristic is assured.
New-type topworks with open yoke of cast steel. Combines accessibility with strength and resistance to shock.
Heavy, calibrated, long-travel springs combine with large diaphragm to give unusually high power - factor; friction made negligible, inner valve positioning extremely precise.
K&M
FLOW

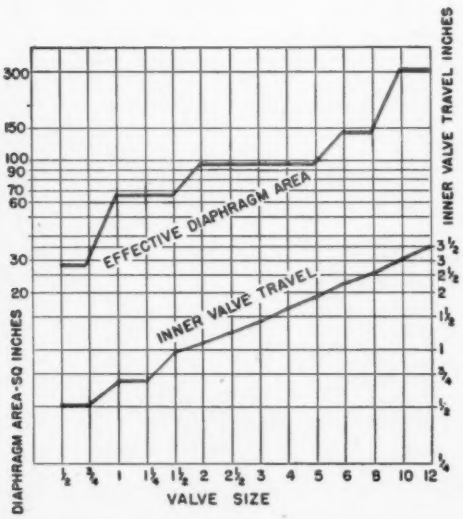


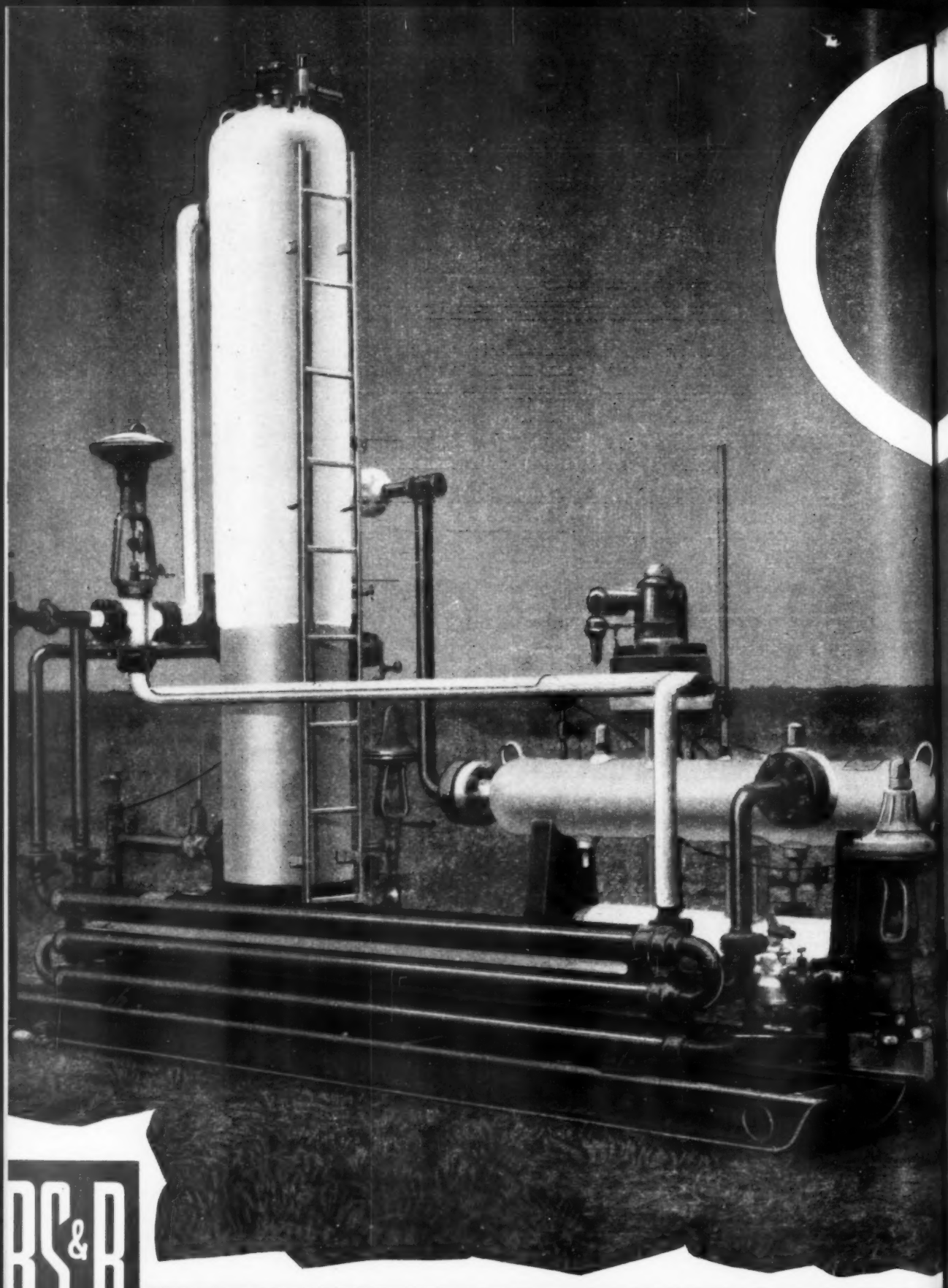
Chart shows effective diaphragm areas and valve travels on K & M Series 1200 and 1400 Control Valves.

KIELEY & MUELLER

Established 1879

2023 —43rd Street North Bergen, N. J.

His extremely accurate circular slide-rule type K & M valve capacity calculator includes correction scales for steam quality, liquid and gas specific gravity and a flowing temperature scale for gases. Sent without charge in response to a request on your business stationery.



BS&B

Low-Temperature Separator

XUM

ompare These Features...

Take a glance at the left-hand page! You are looking at the last word in well head, high-recovery, Low Temperature Separation. This equipment will increase your recovery in the stock-tank of stable condensate as much as 8 or more barrels per million CF of gas produced over conventional separation. Yes, it's another dependable, field-proven, money-saving BS&B product.

MAKE YOUR OWN COMPARISON:

- INCREASED SEPARATOR LIQUID DEPTH insures maximum stabilization for greater stock-tank recovery.
- INCREASED SEPARATOR LIQUID DEPTH reduces chance for hydrate accumulation.
- DEPENDABLE BS&B CONTROLS for trouble-free operations.
- CONCENTRIC TUBE-IN-TUBE HEAT EXCHANGER for high efficiency.
- HIGH VELOCITY CENTRIFUGAL SEPARATION gives high separation efficiency.
- BS&B TEMPERATURE CONTROL assures maximum water removal in water knock-out and constant separator temperature.
- TAILORED TO ANY OPERATING CONDITION to insure maximum operating efficiency.
- PAYS FOR ITSELF IN A SHORT TIME!
- CALL YOUR BS&B FIELD MAN RIGHT AWAY and get his story on this high-pay, low-cost unit!

Note the vertical column in the big picture: See the high frost line. BS&B engineers designed it that way. The result is increased condensate recovery in the stock-tank. Let the hydrates work for you in producing a stable product. It's the vertical liquid height that does it. Send for the bulletin — see address below. NOW!

BLACK, SIVALLS & BRYSON, INC.

Sales Promotion Dept. Section 1-21-25E
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Sales Promotion Department
BLACK, SIVALLS & BRYSON, INC.
7502 East 12th Street Section 1-21-2
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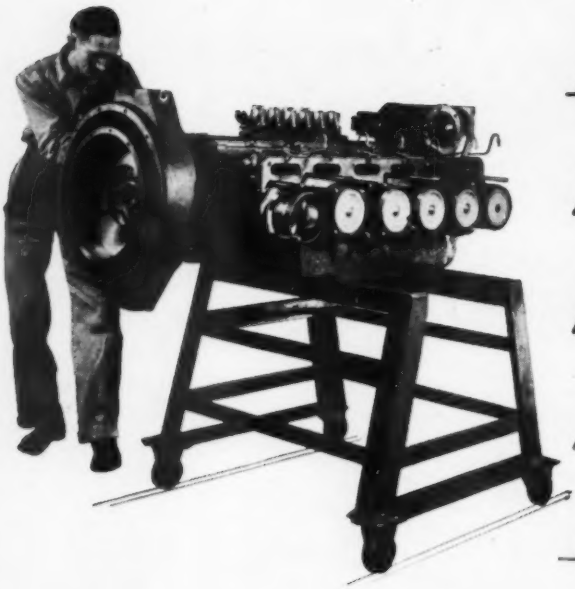
Please rush me your new, fully-illustrated catalog on the BS&B Lo-Temperature Separator.
☐ Have Sales Engineer call.

NAME_____
FIRM_____ TITLE_____
ADDRESS_____
CITY_____ STATE_____

Cummins® Custom-built Diesels



Built not once but Twice

Best buy in power is the engine that's built best

Cummins Diesels have an outstanding record *and* reputation in a wide range of Diesel applications. And here's one reason!

Rugged, lightweight, high-speed Cummins Diesels perform better because they're built better, under strictest quality control methods. Moreover, each engine is actually built twice! After initial assembly, each engine is run in on the test block. Then it is torn down and carefully re-inspected — and after that it is re-assembled and tested *again*.

Such *extra* care in precision building . . . Cummins exclusive fuel system . . . reliable world-wide service and parts organization . . . enable Cummins users to get peak performance . . . less "down-time" and *more* rugged, dependable power.

Better contact your Cummins dealer. He has more facts to show you about making more profits.

Diesel power by CUMMINS

TRADEMARK REG. U.S. PAT. OFF.

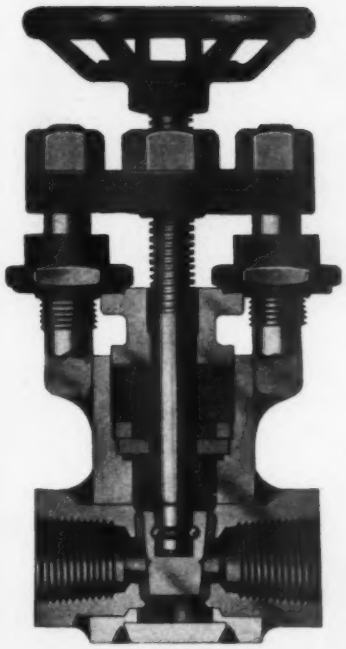
CUMMINS Diesel DIESEL

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. • Cable: Cumdiex

Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks • off-highway trucks • buses • tractors • earth-movers • shovels • cranes • industrial locomotives • air compressors logging yarders and loaders • drilling rigs • centrifugal pumps generator sets and power units • work boats and pleasure craft.

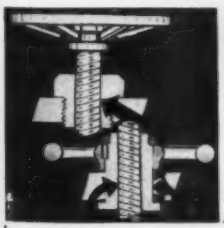
General Purpose
800# HANCOCK
Steel Gate Weldvalves



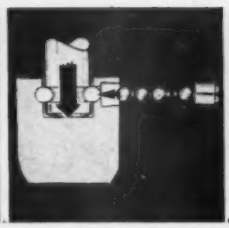
They really score with...

- √ **Integral stellite seats!**
- √ **No bonnet joint!**
- √ **Dissimilar materials in seats and wedges!**
- √ **Self-storing gland!**
- √ **"500 Brinell" stainless steel wedge!**
- √ **Stainless-to-stainless back seating!**
- √ **Gland nut threads protected!**
- √ **Ball-bearing stem-to-wedge connection!**
- √ **Packing ease!**
- √ **Interchangeable parts!**
- √ **Safe, comfortable handwheel!**
- √ **Baked enamel exterior finish!**

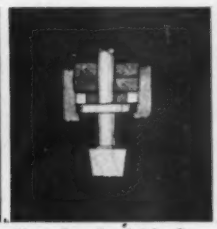
Modern in every detail, with design and operating features found in no other valve, and costing no more than ordinary valves, Hancock *General Purpose* Steel Gate WELDVALVES will take the toughest service, stay tight month-after-month.



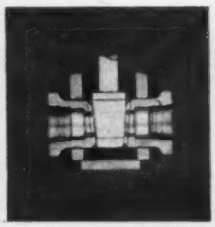
They're Easy to Operate—simple, durable Hancock yoke structure—top illustration—reduces friction to less than ½ that of conventional gate-type valves, bottom illustration.



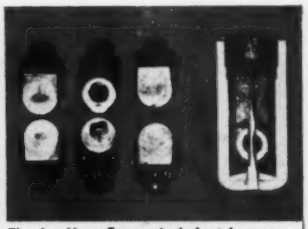
Ball bearing stem-to-wedge connection is safe, sure, long-lasting . . . means even distribution of load, less friction. All components of these stem-to-wedge connections are hardened and ground stainless steel.



They Can Be Safely Repacked Under Pressure—all alloy parts are 11½ to 13½% chromium stainless steel, hardened and ground, assuring positive cut-off. Back seating is also stainless-to-stainless.



They Have Permanent, Dependable Tightness—heavy force is applied to both end components when the valve is being made. The stellite seats are thereby pressed firmly against both sides of the wedge.



They're More Economical, Last Longer—the wedges shown operated a total of 41,872 times, against the downstream side in the valve body, opened to atmosphere and closed at 600# steam, superheated to 850°F. *No galling occurred!*

See Your Hancock Valve Distributor For Prompt, Efficient Service!

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

HANCOCK *Valves*

1877 HANCOCK U.S.A.

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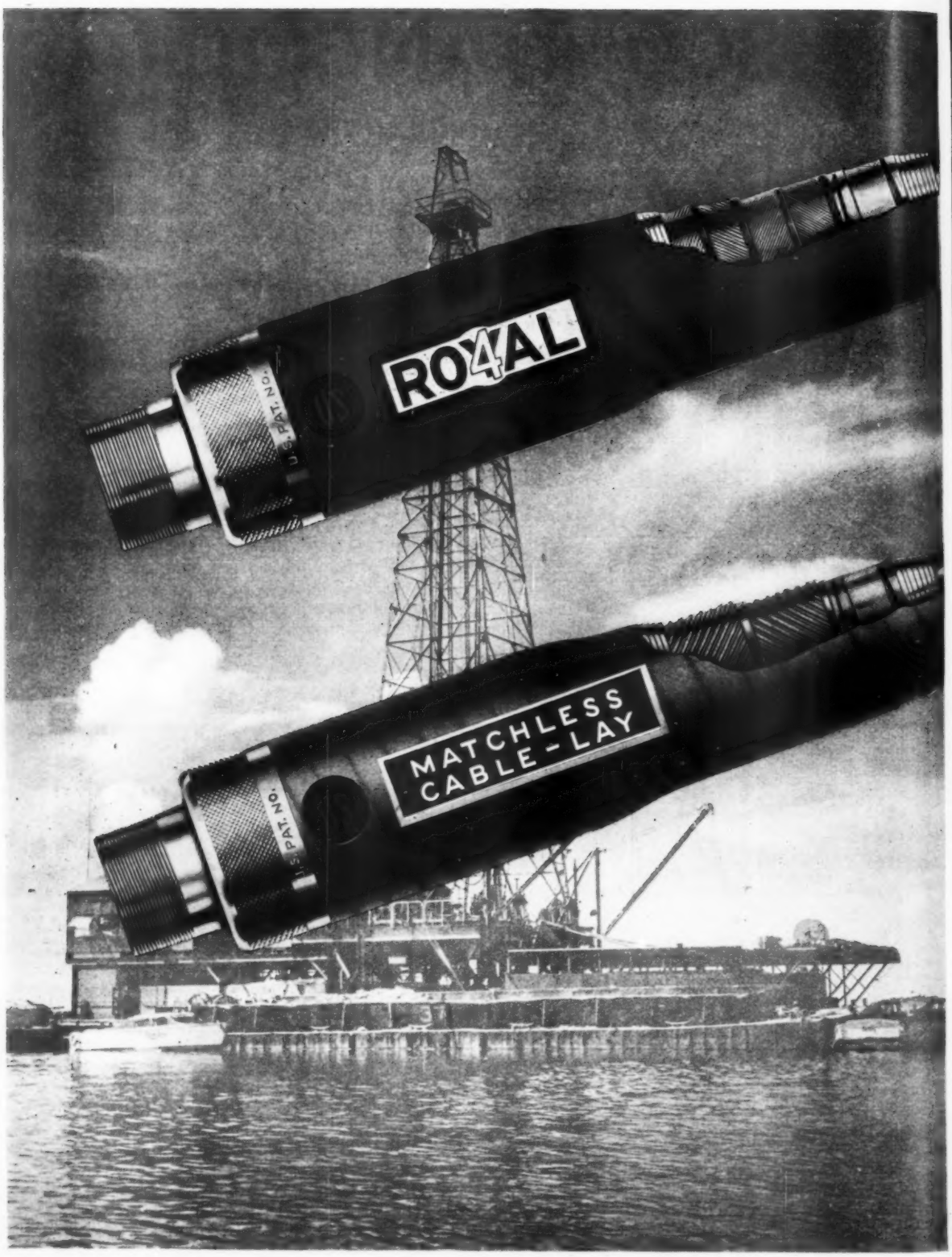
WATERTOWN 72, MASSACHUSETTS

Makers of 'Hancock' Valves, 'Ashcroft' Gauges, 'Consolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments. Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties.

Proven Performances



...without parallel anywhere!

The Great New U.S. ROYAL 4

Never Before—Such Safety and Service in a Rotary Hose

From Gulf off-shore rigs and those along its coasts . . . from deepest fields of East and West Texas, Louisiana and Oklahoma . . . come the fabulous reports of Royal 4 performance. Two long years of extensive test and experiment with many service lengths for every type rig . . . have produced success stories of continuous safety and trouble-free service—such as have never been told before.

FIRST ROTARY HOSE EVER WITH . . .

- **Double Reinforcing Wire Units**—Royal 4 incorporates 2 double wire layers (4 stress wires in all)—each layer with sufficient hydrostatic value to resist bursting should the other become damaged—each a hose in itself.
- **Highest Working Pressure**—rules out all "burst" risk from the greater pressures of the newest pumps—introduces a new standard of safety to rotary hose operation—eliminates costly switching to steel hose when high pump pressures are required.
- **Ultra-Flexibility**—as conclusively demonstrated by rigorous factory "sling" tests—U. S. Royal 4 brings to rotary hose operations a far superior flexibility—as a result of its unique wire-reinforced cotton-and-fabric construction.
- **Complete Kink Resistance**—with extreme flexibility from leakproof coupling to leakproof coupling—Royal 4, even on mast type rigs, resists all forms of kinking throughout its working length.

THE NEW IMPROVED U. S. MATCHLESS CABLE-LAY

Product of exhaustive laboratory tests involving cable wire sizes, strand numbers and degrees of flexibility . . .

Performance-tried and proved to add miles of drilled footage to service life . . .

Now, here is U. S. Rubber's reply to oil industry requests for a better cable-reinforced hose. Here is U. S. Matchless Cable-Lay . . . with 19-strand, *twist-free* cable wire in rubber-cushioned plies . . . with a flexible, yet firm carcass of special cotton fabric . . . ready to demonstrate its longer life of increased flexibility and kink-resistance.

Expert advice and service on the job are yours for the asking. See your "U. S." Distributor about these great new hose or write . . .

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • Rockefeller Center, New York 20, N. Y.

Southwest Texas Operators

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BAROID Well Logging Service

Combines Mud Analysis and Cutting Analysis in a Single Log for Accurate Correlation with All Cores Taken...

Thin, lensing sand conditions in the highly faulted areas of Southwest Texas make geological control of wildcat wells an extremely difficult problem. Here many operators depend on BAROID Well Logging Service to detect the tops of oil—or gas—bearing zones so that they need core only when a positive showing is indicated.

Coring control is only one of the advantages of BAROID Well Logging Service. Count the over-all cost and figure it out for yourself. The saving of valuable rig time, faster, more efficient drilling mean lower cost.

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Chrysler Industrial 7—one of eight basic models.

HIGHER SPEEDS

MEAN BETTER PERFORMANCE AND LOWER COSTS!

For years, operators of gasoline powered industrial equipment, and the engineers who design it, have known that higher speed engines deliver better performance.

Now Chrysler has proved that you can have all the advantages of higher speed—and *lower costs, too.*

Continuous Chrysler research in higher alloy steels and famed Chrysler engineering have produced an industrial engine that runs faster and lasts longer. An engine that *costs less to buy and less to operate!*

A letter of inquiry will bring an engineer to your desk, well qualified to discuss application to your equipment. Address

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HORSEPOWER WITH A PEDIGREE

Change Now to S/V Sovabead

The sooner you get these hard-working beads in your dehydrator, the sooner you'll get greater efficiency . . .

This new Sovabead team is ready now to give you all the benefits of a vastly improved desiccant for natural gas dehydrators.

Why wait until your present drying agent is completely inactive before you change?

Here's what you can get immediately:

S/V Sovabead increases the capacity of your units (almost double). It maintains this capacity at high temperatures (as high as 120° F.) with low effluent dew point.

S/V Sovabead dries sour gas, with a longer bed life. It eliminates caking and reduces channeling, dusting and pressure drops in the bed.

Reactivation is quick, easy, and economical.

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Process Products
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They Say—

Oil Search Essential

"To keep America strong and safe it is absolutely essential that the search for new supplies of oil and gas continue at a high level. The number of wells drilled, and the expansion of transportation and processing facilities, depend primarily on two things: An adequate steel supply and consistently sound government policies in the field of taxation and regulation.

"There is no substitute for steel or working capital. Denying the industry an adequate supply of steel inevitably means fewer wells and a proportionate decline in proved reserves and the means of putting them to use. Denying the industry adequate capital through overly burdensome taxation means fewer wildcat wells and retarded expansion of facilities.

"Unless we continue to seek and find new oil and gas supplies, America's safety—economic, as well as in the field of international relationships—is endangered."

—A. R. Carmody, Shreveport, president of the Louisiana-Arkansas Division, Mid-Continent Oil and Gas Association.

Products to Red China?

". . . I have read in the public press, 'There has been no excuse for our failure to bar the shipment of war-essential goods to Communist China since the outset of the war in Korea.' I have also read, 'The quantity of strategic material that has gone to Red China in recent months is scandalous.'

"Many other similar statements have been made. They are utterly and completely false, and they are unfair to a much-overworked organization in my department known as the Office of International Trade, which handles the difficult assignment of export control.

"The subject is complicated. . . .

"In 1948, we exported 486,569 bbl. of aviation fuel to China; in 1949, exports declined to 91,497 bbl.; and since January 1950, we have licensed none at all.

"In 1948, we exported 561,014 bbl. of automotive fuel to China; in 1949, exports declined to 32,521 bbl.; and we have licensed none at all since January 1950.

"In 1948, we exported to China 147,719 bbl. of kerosine; in 1949, exports to China were only 883 bbl.; and we have licensed none at all since January 1950.

"In 1948, we exported to China 470,286 bbl. of diesel, heating, and other fuel oils; these exports declined in 1949 to 33,337 bbl.; and we have

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Dependable pipe protection starts in this engineering laboratory at PLS. Here, experienced engineers combine their skills to design original equipment that is built in the PLS machine shop for exclusive use by PLS pipe protection specialists.

Advanced-type equipment such as the Grit-Cleaning Machine, scientific preheating ovens and similar developments add up to the more complete, better controlled service that distinguishes pipe protection provided by PLS.

Write for full details.

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Pioneers in Steel Pipe Protection

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Plants at Glenwillard, Penna.; Longview, Texas; Corpus Christi, Texas; Harvey, La.; and Sparrows Point, Md.

For HEAVY DUTY pumping at low cost... compare the PELTON "C-P" long stroke JACK to lift MORE FLUID... at LESS COST!

SPHERICAL BALANCE TANK

To permit skid construction, ample air-capacity for even loading and low overall height.

INTERCHANGEABLE ROTORS

Pump body will take three sizes of pump rotors, providing the proper speed range for each particular installation.

PELTON PUMP BODY

Designed specifically for this application using triple screw positive displacement rotors to provide rugged and efficient operation.

NO LUBRICATION

All pump bearings are internal, and are continually running in a clean oil bath.

AUTOMATIC COOLING SYSTEM

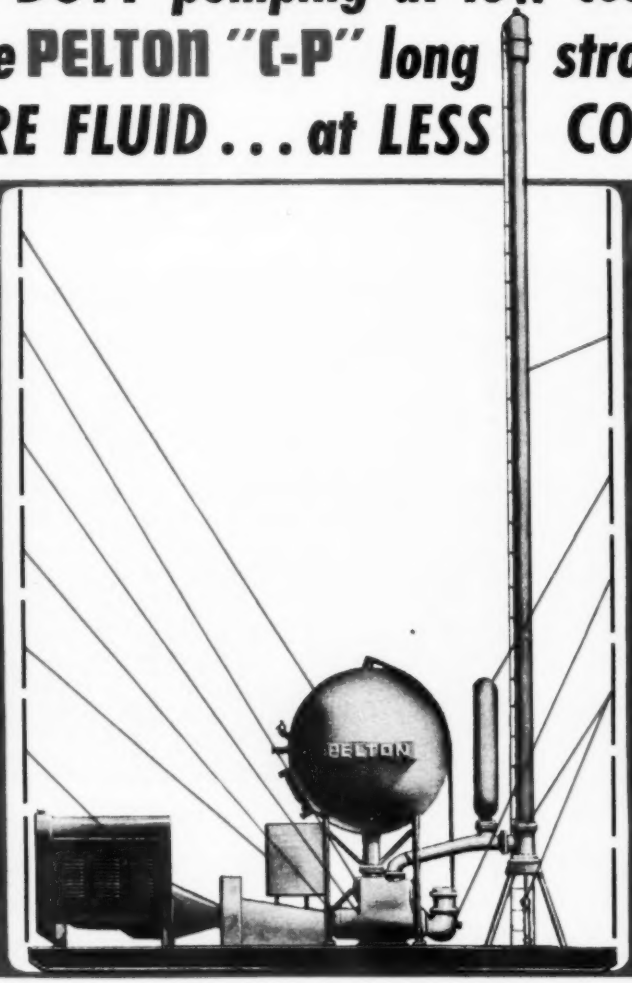
External supply of cooling water is unnecessary with an automatically regulated cooler.

DIRECT DRIVE—AMPLE SPM

Ample pump capacity provides the desired SPM (up to 350 FT/min Polished Rod Velocity) without using a speed increaser.

UNITIZED SKID MOUNTING

Only one connection, the gas line to the engine, is broken to move the unit on or off a well, making it unnecessary to break the hydraulic or pneumatic circuit for pulling operations.



TWELVE MONTH GUARANTEE

Indicating the field proven reliability of Pelton pumping equipment.

30' SURFACE STROKE— 40,000 LB. PRL

Interchangeable cylinders make possible 20', 25' or 30' surface strokes with a polished rod load rating up to 40,000 lbs. Stroke length may be varied during operation with a hand operated valve.

SUCKER ROD STRESS CONTROL

The accumulator maintains an even load on the rod string, thus reducing both the peak sucker rod stress and the load range.

PISTON TYPE SCAVENGER PUMP

A two-stage slow speed combination scavenger pump-air compressor provides long life and eliminates air locking.

PUMP SPACING ADJUSTMENT

Designed with ample clearance to insert 1' sub rods. Hand operated valve provides pump spacing adjustment during operation.

SAFETY FEATURES

Unit automatically shuts down in case of a rod part, stuck bottom hole pump, etc.

AUTOMATIC COUNTERBALANCE AND OIL LEVEL REGULATORS

The counterbalance pressure and the operating fluid is automatically maintained at the correct level.

THE PELTON LONG STROKE

Fewer rod reversals per minute are required to obtain the desired production, resulting in longer rod and pump life. The stroke loss due to rod and tubing stretch is reduced and the bottom hole pump efficiency is increased which in turn aids in handling gassy or sandy fluids as well as increasing the production rate.

THE PELTON HYDRAULIC DESIGN

Sucker rod life is further increased with soft controlled rod reversals, a constant polished rod velocity over the greater portion of the surface stroke, and the use of the stress control accumulator.

THE PELTON MECHANICAL DESIGN

Extra capacity is provided to lift all the fluid desired with high mechanical efficiencies. Rugged construction provides long life with a minimum of surface maintenance. Simplified controls make for easy operation. Interchangeable parts insure quick servicing.

THE PELTON SERVICE

Service engineers are available 24 hours per day wherever Pelton equipment is pumping.

THE COMPLETE PELTON LINE

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licensed none at all since January 1950."

Charles Sawyer, Secretary of Commerce, in an address before the New England Shoe and Leather Association.

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". . . So long as anything like present differentials in competitive fuel prices are maintained, there appears to be no limit to the demand for this cheap and desirable commodity (natural gas).

"I do not yet see, in terms of what appear to be reasonable reserve prospects, any reason for denying the advantages of natural gas to areas which do not now enjoy them, or any occasion for a general limitation by fiat of the uses to which natural gas may be put.

"Thus to generalize about the situation as a whole, however, is not to say that the commission (FPC), any more than the investor, can afford not to examine with the utmost care the gas supplies available to particular pipe-line systems which seek to furnish new or enlarged service."

Nelson L. Smith, commissioner, Federal Power Commission, in an address before the New York Society of Security Analysts.

CALENDAR

1951

February

American Geophysical Union, twenty-sixth regional meeting, Fresno State College, Fresno, Calif., February 9-10.

American Institute of Mining and Metallurgical Engineers, annual meeting, Jefferson and Statler hotels, St. Louis, February 19-22.

Kentucky Petroleum Marketers Association, annual meeting and trade show, Brown Hotel, Louisville, February 20-21.

Kansas-Oklahoma Water Flood Operators, monthly meeting, Booth Hotel, Independence, Kans., February 21.

National Association of Corrosion Engineers, Tulsa Section, Short Course on Practical Control of Pipe-Line Corrosion, Mayo Hotel, February 21-23.

Missouri School of Mines and Metallurgy, water-flooding symposium, Rolla, Mo., February 23.

Iowa Independent Oil Jobbers' Association, Inc., annual convention, Hotel Fort Des Moines, Des Moines, February 21-22.

Wisconsin Petroleum Association, annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 27-28.

San Joaquin Valley Oil Producers Association, annual meeting, Bakersfield Inn, Bakersfield, Calif., February 28.

March

American Association of Petroleum Geologists, Rocky Mountain Section, Shirley Savoy Hotel, Denver, March 1-2.

New York Oil Heating Association, Inc., Hotel Statler, New York, March 5.

American Society for Testing Materials, spring meeting and committee week, Cincinnati, March 5-9.

American Petroleum Institute, division of production, southwestern district meeting, Hotel Beaumont, Beaumont, Tex., March 7-9.

Indiana Independent Petroleum Association, spring convention and refiners and suppliers exhibit, Hotel Severin, Indianapolis, March 8-9.

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Texas Oil Jobbers Association, Inc., spring convention and refiners and suppliers exhibit, Shamrock Hotel, Houston, March 9-10.

Mid-West Gas Association, Hotel Fontenelle, Omaha, March 13-14.

First South American Oil Congress, Montevideo, Uruguay, March 12-16.

Illinois Petroleum Marketers Association, annual convention, Sherman Hotel, Chicago, March 13-15.

National Association of Corrosion Engineers, annual conference and exhibition, Statler Hotel, New York City, March 13-16.

Gas Appliance Manufacturers Association, annual meeting, The Homestead, Hot Springs, Va., March 19-21.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 20-22.

American Petroleum Institute, division of production, Mid-Continent district spring meeting, Herring Hotel, Amarillo, March 21-23.

North Texas Oil and Gas Association, annual meeting, Kemp Hotel, Wichita Falls, Tex., March 24.

Texas Independent Producers and Royalty Owners Association, fifth annual meeting, Beaumont, Tex., March 27-28.

New England Gas Association, annual meeting, Hotel Statler, Boston, March 29-30.

April

American Gas Association, industrial and commercial gas section, conference on industrial and commercial gas, Shoreham Hotel, Washington, D. C., April 2-4.

American Society of Mechanical Engineers, spring meeting, Atlanta, April 2-5.

Oil-Heat Institute of America, annual convention and National Oil-Heat Exposition, Navy Pier and Palmer House, Chicago, April 2-6.

Instrument Society of America, New Jersey section, Essex House, Newark, N. J., April 3.

American Petroleum Institute, division of production, Eastern district meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 3-5.

Midwest Power Conference, fourteenth annual meeting, Sherman Hotel, Chicago, April 4-6.

New York Oil Heating Association, Inc., Hotel Statler, New York, April 9.

Mid-West Regional Gas Sales Conference, Edgewater Beach Hotel, Chicago, April 9-11.

Michigan Petroleum Association, annual spring convention, Detroit Leland Hotel, Detroit, April 10-11.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 10-12.

American Institute of Electrical Engineers, District 4 meeting, McFadden-Deauville Hotel, Miami, April 11-13.

American Gas Association, distribution, motor vehicle, and corrosion conference, Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Brussels International Fair, twenty-fifth annual event, Brussels, Belgium, April 21-May 6.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

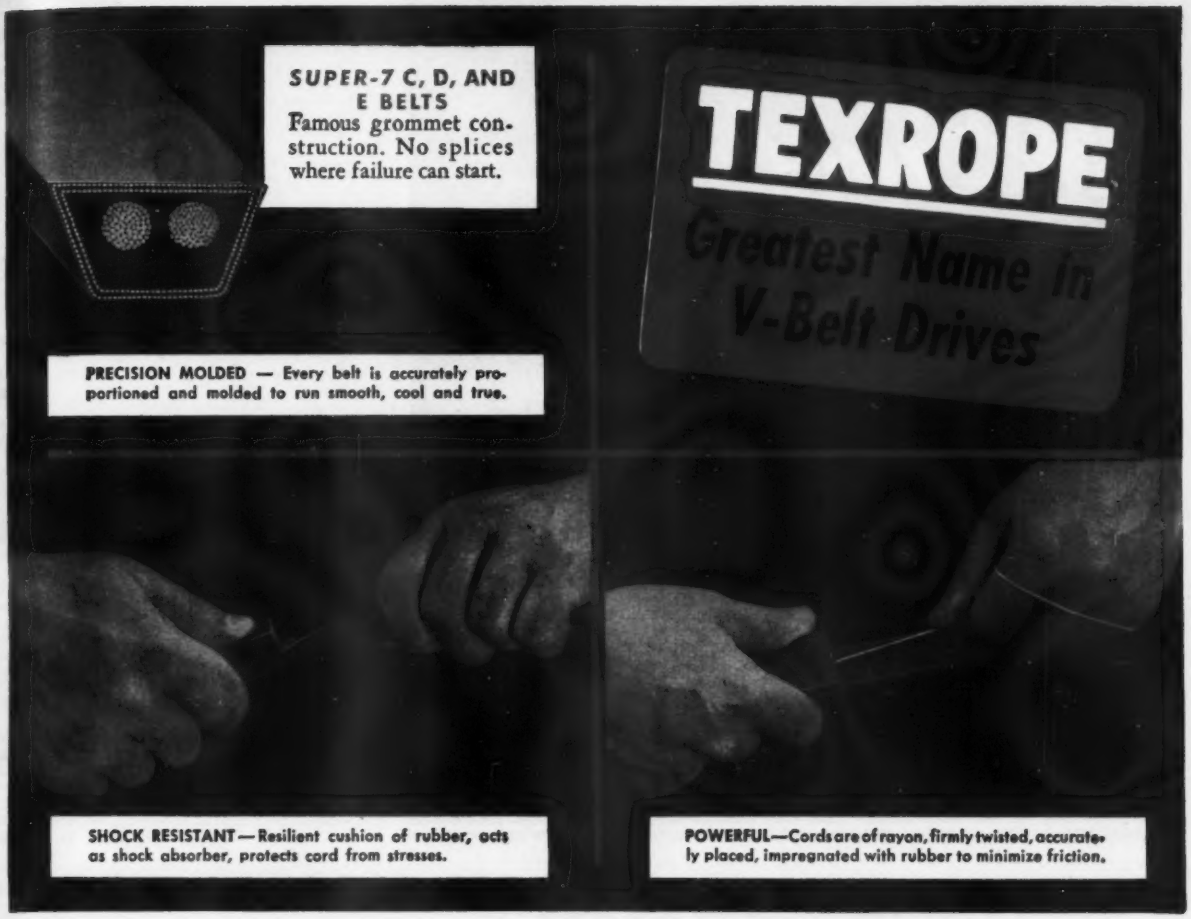
American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Natural Gasoline Association of America, annual convention, Mayo Hotel, Tulsa, April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27.

Interstate Oil Compact Commission, spring meeting, La Fonda Hotel, Santa Fe, N. M., April 26-28.

American Gas Association, industrial and commercial gas section, industrial gas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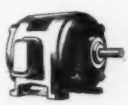

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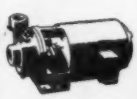

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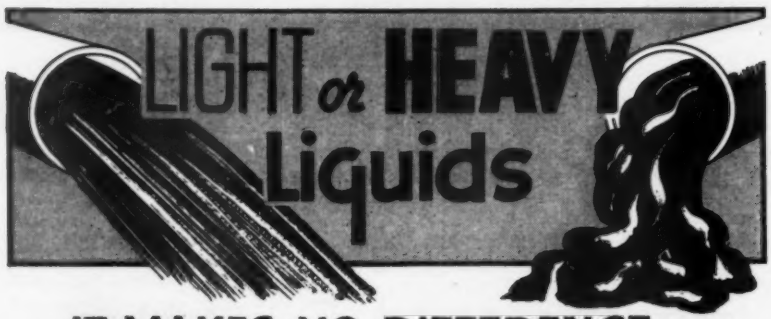

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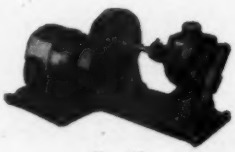

Fig. 12

See Our Catalog in SWEETS

Viking PUMP COMPANY Cedar Falls, Iowa

school, William Penn Hotel, Pittsburgh, April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3.

Materials Handling Conference, International Amphitheatre, Chicago, April 30-May 4.

May

American Institute of Electrical Engineers, District 1 meeting, Hotel Syracuse, Syracuse N. Y., May 2-4.

New York Oil Heating Association, Inc., Hotel Statler, New York, May 7.

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association, annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, May 10-11.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

American Institute of Electrical Engineers, District 5 meeting, Loraine Hotel, Madison, Wis., May 17-19.

Empire State Petroleum Association, Inc., Hotel Statler, Buffalo, N. Y., May 20-22.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

June

Society of Automotive Engineers, Inc., summer meeting, French Lick Springs Hotel, French Lick, Ind., June 3-8.

New York Oil Heating Association, Inc., Hotel Statler, New York, June 4.

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Pennsylvania Grade Crude Oil Association, 1951 annual meeting, Hotel William Penn, Pittsburgh, June 14-15.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

American Institute of Electrical Engineers, summer general meeting, Royal York Hotel, Toronto, June 25-29.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads, first Monday of each month, Louis Sherry's, 300 Park Ave.

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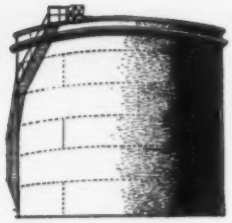

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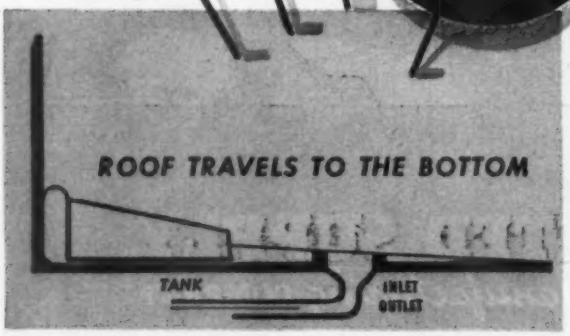

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JOURNALLY Speaking

We Catch 'em Young

MANY an oil man will tell you he cut his teeth on a copy of The Oil and Gas Journal, and here's a young man who is starting out in the right way to become a Big Time Operator in the oil business.

This future BTO is John Gordon, 6-month-old son of E. Forbes Gordon, a petroleum engineer with The Texas Co. at Houma, La. If Johnny keeps up his reading habits with all the serious attention he is here giving our favorite oil publication, the industry will hear a lot from him along about 1981.

Of course, Johnny isn't an oil man yet and so he can't subscribe himself, but this illustrates our widespread "pass along" readership. We know that each copy of our book is read by several people in addition to the original addressee, and here's proof that it is handed down from father to son.

Wonder what article he's reading. Probably one of our long-haired technical discourses. If it were this page he should be laughing.

Iron Curtain

A NUMBER of trade and technical publications recently have announced that they have stopped sending copies to Russia in keeping with the State Department's "cold war" policies. We did this, very quietly, some time ago.

Some people may wonder why we ever let the commies get our invaluable publication in the first place, but it must be remembered that our Government still maintains diplomatic recognition of the Soviet Government, that for a long time our official position was that we could be friends with the Russians, and that the American philosophy has always favored free exchange of information. But we got fed up with all give and no take and the impossibility of getting anything worth while from the other side of the Iron Curtain, so we just cut them all off.

Of course, the commies can still get information about the American oil industry if their red network in this country is as extensive as we are led to believe it is, but for our part they will have to do it the hard way and without any help from us. The Russian subscriptions all went to Soviet government oil officials, but for a long time we tried to service privately owned oil operations in the satellite countries of Eastern Europe, but this group keeps getting smaller and smaller. Typical is a letter we got the other day from a British company which used to operate in Romania, sadly informing us that the firm is in compulsory liquidation due to the sequestration of its properties by the Communist government of that country.

In the Films

OUR favorite oil publication is now in the films—microfilms, that is. An outfit in Ann Arbor, Mich., known as University Microfilms, which makes a specialty of this sort of thing, has undertaken to photograph every page of the Journal, starting with our 1949 volume. A whole year of the Big Yellow Book is thus compressed into a tin can that you can carry in your pocket or stick away in the safe. This should be a boon to people who save everything, and we don't know of anything pertaining to oil that's more worthy of saving.

You need a projector to read it, but we find that the image can be blown up to where even the fine print is entirely legible. Quite a few copies of our microfilms have been purchased by libraries and oil researchers. We feel quite flattered, even though it is a bit deflating to see how small our whole year's effort looks in the form of a microfilm.

—*Henry D. Ralph*

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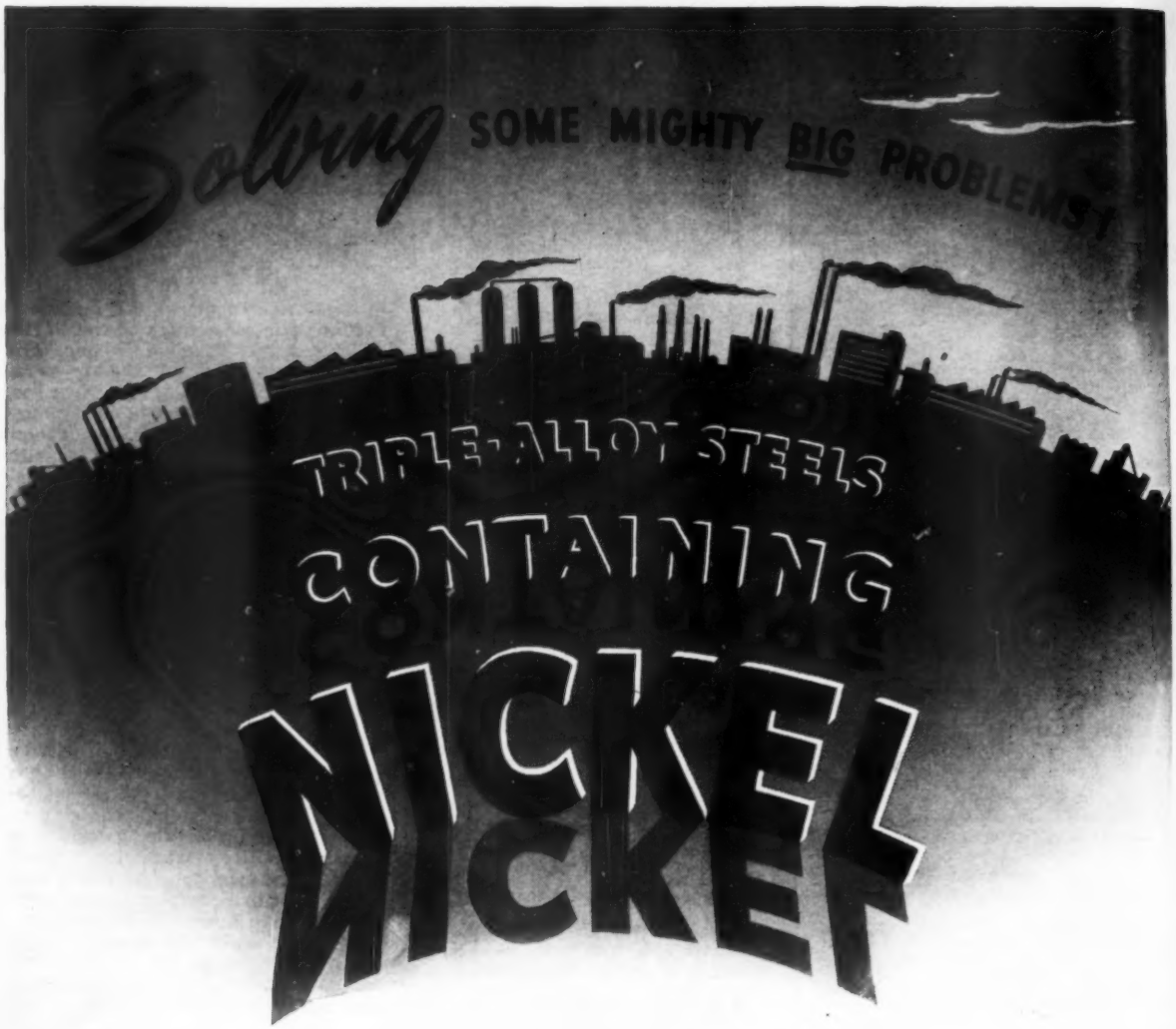

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Below the Belt

Once again the President of the United States has used his high office to vilify the petroleum industry and hold it up to public scorn as a tax dodger. Attacking the historic depletion allowance, he spoke of "loopholes" and "the gross undertaxation" of the oil industry.

It was only a year ago that the President made a vigorous attack on the depletion allowance, using uncalled-for snide language impugning the oil industry's patriotism in using some of its gross earnings to find more oil. But after long deliberation, Congress found the depletion allowance justified and refused to make any change.

On several previous occasions Congress has said that the depletion allowance is not a loophole. A loophole is a technical deficiency in the language of a law which enables a crafty evader to escape its intended application. The depletion allowance is as old as the federal income tax, and was deliberately and specifically written into every revision of the law. Its purpose is to encourage the investment of capital in the risky venture of exploration; it has never operated as a means of evading taxes. To call it a loophole is an unjustified slur on the industry.

Even more unfair is the new charge of gross undertaxation of the oil industry. The petroleum industry accounts for about 3 per cent of the national income but provides nearly 7 per cent of the total tax revenue of federal, state, and local governments. It pays every kind of tax that any industry pays and some that most do not.

To add injury to insult, the administration proposes to double the federal gasoline tax in the same breath it attacks the depletion allowance as evidence of undertaxation. A tax of 3 cents a gallon at the refinery would make an excise of more than 25 per cent, the highest imposed on all but a very few commodities such as whisky. Yet in the face of this the administration indicts the entire industry for gross undertaxation.

If the President really believes the depletion allowance is improper or outmoded, why can he not present his reasoning on its merits, if any, instead of resorting to sideswipes and sneers? The answer probably is that the industry has many times patiently and laboriously proved to Congress that the allowance is completely justified on every ground and is essential to this industry even though it may not have an exact parallel in the taxation of other enterprises.

Now the industry must again defend the depletion allowance on its merits and also must defend its reputation against the President's latest slurs. In view of the history of the depletion allowance, of the industry's over-all tax payments, and of his defeat on the same issue last year, the President is hitting below the belt when he tells the public the oil industry is evading its fair share of taxation.

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THIS WEEK

TAXES—Oil depletion allowance again under heavy attack by administration as "loophole." . . . Reduction from 27½ to 15 per cent asked. . . . ¶President says petroleum industry "grossly undertaxed." . . . ¶Doubling of federal gasoline tax to 3 cents per gallon is among excise proposals. . . . ¶Higher corporation, capital gains schedules included in new revenue proposals. . . .

STEEL—Assurance increasing among oil operators that an adequate supply of tubular goods, other materials will be available for operations through administrative procedures now being perfected in Washington. . . . ¶Authorities in capital have said there will be enough tubular goods to drill 44,000 wells this year, and this statement is being backed up by action to allocate sufficient steel to pipe mills to keep them operating at capacity. . . .

SHORTAGES—Temporary shortages in fuel oil, L.P.G. brought about by severe weather, coupled with switchmen's strike on Midwest railroads. . . . PAD sets up emergency office in Chicago to expedite distribution of supplies to critically short areas. . . . ¶Agency estimates it will be weeks, under most favorable conditions, before normal conditions can be restored. . . .

OCTANE BATTLE—Sun Oil Co.'s president explains company's stand on PAD's proposed order to lower octane rating of motor gasoline. . . . Declares no hardships would result under rationing system. . . . ¶Standard of Ohio's president says firm is convinced of necessity to conserve TEL for national defense, but is opposed to method proposed by agency. . . . Recommends stockpiling, apportionment on equitable basis. . . .

TIDELANDS—All money deposited with Government by oil operators in gulf tidelands areas will be refunded unless Congress provides legislation for federal supervision over submerged areas. . . . ¶Hallanan of Plymouth Oil Co. urges congressional leaders to hurry up with legislation, so that exploration, operation can continue. . . . He warns that unless action comes soon, operations will end completely. . . .

CONTROLS—Authority of deputy petroleum administrator clarified as original order setting up PAD is drastically revised. . . . ¶ESA announces tentative organization plan which would call for separate branches to deal with petroleum, gas. . . . ¶Some commodities normally produced or supplied only for military use are unfrozen by OPS. . . .

INDUSTRY—Socony-Vacuum president discloses that firm had 3.8 billion barrels of crude-oil reserves at end of 1950. . . . Cites firm's world-wide operations and accomplishments. . . . ¶Gulf Oil Corp. to increase output of ethylene at its Port Arthur works, which will raise U. S. total output by 12 per cent. . . . ¶Frank A. Morgan of Richfield Oil Corp. elected president of A.A.P.G. . . .

ACTIVITY—Crude production for week ended February 3 averaged 5,870,950 bbl. daily, down 118,240 bbl. daily from previous week. . . . ¶Total well completions decreased to 753 from 837 for previous week. . . . Wildcat completions were off 36 wells to 138. . . . ¶Rotary rigs operating in United States on January 29 totaled 2,111 compared with 2,055 on January 22. . . .

TRENDS—Refiners produced 48,934,000 bbl. of distillate fuels in the 5-week period ended January 27, an increase of 11,615,000 bbl. or 31.1 per cent over same period last year. . . . ¶Distillate stocks were reduced 14,276,000 bbl. compared with 12,325,000 bbl. in the same 5-week period last year. . . . Indicated demand for distillates averaged 1,806,000 bbl. daily. . . .

INTERNATIONAL—Russia couldn't utilize Middle East oil for several years even if she took over areas in event of war, Socony-Vacuum president declares. . . . Transportation shortages cited as main cause. . . . ¶Texas Petroleum Co. to drill new test in northern Falcon in western Venezuela. . . .

COLD.—The extreme cold weather which gripped the major portion of the United States this week slowed pipe-line construction, brought heavy demands for oil and gas fuel, required curtailment of natural gas to many industrial users, and raised some public cries for further expansion of pipe-line and storage facilities. On top of this a switchmen's strike hampered tank-car deliveries of fuel oil and L.P.G. in many areas, requiring emergency distribution efforts and some temporary rationing of supplies in various localities.

Tax Program

President asks Congress for big revenue increase; urges depletion-allowance cut, plugging of tax "loopholes"

Bertram F. Linz

WASHINGTON. — Immediate sharp increases in taxes were asked of Congress last week by President Truman, who proposed that an additional $4,000,000,000 of revenue be raised by higher personal income taxes, $3,000,000,000 by higher corporation levies, and another $3,000,000,000 by expansion of excise taxes.

At the same time, the President urged the closing of "loopholes" in the revenue laws, and specifically the percentage depletion allowance for oil and gas production, the preferential treatment of capital gains, and the exemption of farmer cooperatives.

The President's message did not propose any detailed rates to bring in the revenue he has in mind, but in congressional circles it was said it would require an increase of about 4 points in each bracket of the personal income-tax schedule, a 55 per cent rate on corporations, and increases in most of the present excise taxes with the rate on gasoline, for instance, going from 1½ to 3 cents per gallon.

Protests noted.—Whether the new tax bill will run to $10,000,000,000, as proposed by the President, appears to be open to some question. Members of Congress who have recently announced what they thought should be done in the way of increasing taxes have found themselves on the receiving end of a bitter barrage of protesting letters, the general tenor of which is that the people are unwilling to stand for further inroads on their income so long as the administration continues its spending-as-usual policy.

But in his message, the President expressed the firm conviction that "a balanced budget now is just as important a mobilization measure as larger armed forces, allocations of basic materials, and controls over prices and wages," leading industry observers to ask when he became converted to a balanced-budget policy.

The President told Congress his program will require higher rates of taxation than were in force during the war, but commented that they were not high enough then and said the alternative would be dangerous inflation. He strongly defended his budget for 1952 as "sound" but made no mention of the possibilities of reducing government expenditures for nonessential activities which some in Congress believe can be shaved by anywhere up to $5,000,000,000.

No danger.—Truman saw no danger to corporate profits in the program, declaring that "in the light of high and rising corporate profits, the increase in corporation taxes I propose will leave corporations generally able to maintain the dividend and reinvestment policies of recent years." Later in the year, he said, Congress should consider what changes are desirable in the excess-profits-tax law to obtain more revenue from that source.

The appeal that loopholes in the law be plugged was a tempered restatement of the President's previous bitter attacks on the oil industry and entrepreneurs generally.

"Under taxation."—"I have previously called attention to the gross undertaxation of the oil and mining industries, to the broad loopholes in the estate and gift taxes, and to the undue preferential treatment granted to capital gains in comparison with ordinary income," he said. "I urge the Congress to examine these provisions of the law very carefully, together with those relating to life-insurance companies and to holders of securities now exempt from income taxes, and to review the tax status of organizations now exempt under present law.

"I do not believe any of us, in good conscience, can take action to increase taxes on the man, with a wife and two children, who earns $60 a week —an increase I am now recommending—without at the same time taking action to reduce the glaring inequities in present law—some of which permit a man with 100 times as much income to avoid paying any taxes at all."

Oil's Taxes

Cut in depletion allowance to 15 per cent, taxation of co-ops, higher gasoline tax recommended to Congress

WASHINGTON. — Reduction of the 27½ per cent depletion allowance for oil production to 15 per cent and revision of the present option of expensing drilling costs, together with taxation of cooperatives, doubling of the gasoline tax to 3 cents per gallon, and an increase in the corporation rate to 55 per cent, were among the recommendations laid before the House ways and means committee February 5 by Secretary of the Treasury John Snyder to develop the $10,000,000,000 additional revenue sought by President Truman.

Snyder declared the percentage depletion allowance is "one of the major structural defects" in the tax law, costing the Government and taxpayers in general "hundreds of millions of dollars each year."

"Under the percentage depletion provisions," Snyder explained in laying his program before the committee, "owners of oil wells are allowed to deduct a specified percentage of their gross income without regard to the capital cost of the property. Unlike other capital-recovery allowances, percentage depletion continues to be deductible even after 100 per cent of the investment has been recovered tax free. Thus total deductions may eventually amount to many times the taxpayer's actual investment.

Other deductions.—"In addition to the highly favorable depletion allowances, oil producers can immediately deduct for tax purposes a substantial part of their outlays for drilling and development. The amounts of capital investment thus written off at the outset have no effect on the future percentage depletion deductions. This results in a double deduction with respect to the same capital investment. The combined impact of percentage depletion and the privilege of deducting drilling and development costs as a current expense is to wipe out the tax liability on incomes running into millions of dollars."

Snyder declared that the Treasury discussed the matter in detail when the 1950 tax-revision bill was under consideration.

Urgency greater. — "The urgency of remedial legislation in this area is even greater at the present time," he insisted. "I urge the committee to give earnest consideration to the previous Treasury suggestion that the rate of percentage depletion be reduced to 15 per cent of gross income for oil and gas. In addition, oil and gas operators who elect to expense intangible drilling and development costs should be required to make corresponding adjustments in the basis for computing their percentage depletion. This would mitigate the double reduction which compounds the potentialities for tax reduction under the present treatment."

Snyder also told the committee that cooperative organizations should be subjected to corporation tax rates on funds which are not returned to

members, which he said are now "available tax-free for expansion in competition with other taxable businesses." Such taxation, he held, would not impair the ability of cooperatives to perform their traditional functions of collective buying and selling.

Gasoline tax.—Treasury experts estimated that a 3 cent tax on gasoline would raise an additional $580,000,000 a year, apparently not believing that automobile sales would be slowed down by a concurrent proposal to increase the tax on passenger cars from 7 to 20 per cent to raise an additional $685,000,000.

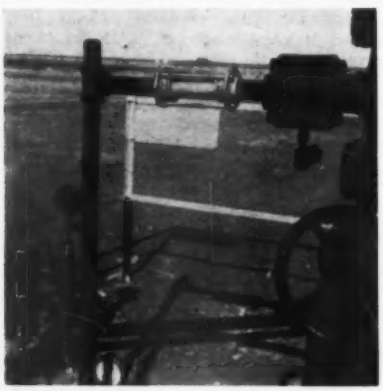
To raise the additional $3,000,000,000 from corporations sought by the President, Snyder told the committee the rate on the first $25,000 of corporate income would have to be raised from 25 to 33 per cent and the rate on income in excess of $25,000 from 47 to 55 per cent, increasing the combined maximum rate on income subject to the excess-profits tax from 77 to 85 per cent and necessitate raising the present 62 per cent ceiling to 70 per cent.

Capital gains. — Snyder also recommended a 50 per cent increase in the capital-gains tax, which he pointed out has not been increased in proportion to the income tax. He suggested that the short-term period be extended to 1 year to catch speculative profits, and that present provisions applicable to profits realized from the sale of business property be revised to prevent the conversion of what he held in reality business income to capital gains.

Retorts prompted. — President Truman's attack on alleged undertaxation of the oil industry in his tax message brought a prompt retort from J. E. Warren, president of the Independent Petroleum Association of America, that "the petroleum industry pays its proper share of taxes" and is ready to bear its proper share of any general increase in the tax burden.

Warren warned, however, that any "tampering with the time-tested and proven means of discovering oil and gas" would be a serious blow to the Government's effort to expand the industry's capacity in the interest of national security.

"The congress will have to decide whether dollars are more important than oil to our safety," Warren declared. "With increased costs, frozen prices, and the necessity for increased findings efforts, there is a need for greater incentives through tax provisions, not less. We cannot afford now to subject either the military or civilian users of petroleum to the threat of shortage of supply or greatly increased prices."



"Look Box"

This picture, taken at Shell Oil Co. 3 Kelley, Elk City field, Oklahoma, caused a lot of head scratching when shown to production engineers. None of those questioned had seen anything quite like it, and guesses ranged from "current interrupter" to "Dresser sleeve." Actually it is a form of "look box," a device familiar to all refiners. The section of transparent plastic in the well-head flow line enables the pumper to tell at a glance whether the well is pumping. The experiment is said to work well with green or light-colored oils but to be useless for black oils which coat the inside of the nipple.

TEL Cut

Sun Oil Co. explains its stand on PAD proposal to lower octane rating of motor gasoline; Sohio also opposes plan

WASHINGTON. — An across-the-board cut in tetraethyl lead available to refiners for civilian gasoline would involve little or no hardship and raise no difficult problem of "hardship cases" for the Petroleum Administration, Deputy Administrator Bruce K. Brown was told this week in a letter from Robert G. Dunlop, president of Sun Oil Co.

Dunlop, who led the group which opposed the proposed PAD ceilings on octane ratings at the hearing January 25 and proposed as an alternative general rationing of TEL at the refiner level, submitted an answer to the query posed by Brown as to the manner in which hardship cases would be handled under rationing, specifically whether, in such a case, a refiner should be given all the TEL he requested, enough to enable him to maintain the quality of the gasoline he was manufacturing immediately prior to issuance of the reduction order, or enough to enable him to produce gasolines with octane numbers that would match those of his competitors' products.

Exemptions. — Pointing out that his suggestion for rationing envisioned exemption for all refiners running 30,000 bbl. or less crude a day to stills on the assumption that they are small business enterprises within the terms of the Defense Production Act, Dunlop told Brown if this were done there would be, in substance, no hardship cases.

All such refiners, Dunlop wrote, would be entitled to receive the full amount of TEL which they received in whatever base period is provided in the reduction order, and if their larger competitors, not entitled to this exemption, "did not desire, or found themselves unable to maintain the previous octane numbers of their gasoline, then, those within the exempted classification would have an improved competitive position.

No hardships.—"Under this proposed exemption, therefore," Dunlop continued, "there could not develop any 'hardship' at all for any small refiners that would, either in fairness or under the provisions of the Defense Production Act, merit any further consideration from PAD in connection with such a tetraethyl-lead reduction order."

The only hardships that would develop would arise from the particular base period selected, which might cover a period when a given refiner's facilities were shut down due to strikes or other reasons and throughout which a refiner might not have been a user of tetraethyl lead, but these instances could be dealt with by giving such refiners more representative base periods, Dunlop said.

Can't agree.—"We cannot agree that PAD or any other government agency has any obligation or any right to undertake to guarantee to any enterprise a specified competitive position in business, beyond the requirements for the protection of 'small-business enterprises' contained in the Defense Production Act," he declared. "In our opinion, the obligation of PAD under the Defense Production Act is to administer its affairs in such a manner that all enterprises affected by its orders have the opportunity to compete on the basis of their facilities, skills, initiative, and resourcefulness to the fullest extent possible short of harming the national-security efforts.

"This objective can be fully achieved under the uniform percentage-reduction plan, with regard for small-business enterprise and 'hardship' cases, that has been suggested as an alternative for the PAD proposed ceilings on octane numbers."

Sohio's position.—Also taking a lead in the opposition of PAD's proposed octane cut was Standard Oil Co.

WATCHING WASHINGTON

Bertram F. Linz

Hot vs. Cold

Proposals now under consideration to expand the Government's synthetic-rubber output by increasing the production of cold rubber by 120,000 long tons to a total of 305,000 tons are the subject of controversy between "hot" and "cold" rubber wings.

Based on the length of time required to install the first cold-rubber capacity, the expansion program would take 12 to 15 months and the argument over it, if prolonged, might slow down an increase in output.

Proponents of increased hot-rubber output argue that more rubber of that type can be produced with the same equipment and the need is for rubber of any variety, in volume, and quickly.

The cold-rubber group believes that the amount of that type of rubber will go further in end products than hot rubber and, furthermore, the whole rubber program will be made more secure by gradual expansion of the more efficient product.

Meanwhile, a degree of confusion has been added to the problem by the claim of General Tire & Rubber Co. that it has developed a new type of synthetic that would increase the capacity of the plants and add some 20 per cent to our current supply.

Crazy Confusion

If Alice was confused in Wonderland she should come to Washington where it isn't necessary to be crazy but it certainly helps.

Take, for example, the issuance of the price-freezing regulation by the Economic Stabilization Agency.

The order was announced at a quickly called press conference at 7 p.m., January 26, which was itself a scene of confusion. No copies of the order were available for the press and through the night the ESA mimeographs ground them out under the handicap of having to stop every once in a while so an ESA attorney could rewrite another provision. It was 1 o'clock in the morning before the last page of the order came off the machine.

Or take the case of the defense agencies as a whole. When the President set up the defense organization he delegated certain powers to various agencies, Interior for one. Then, when he set up the Defense Production Administration last month it was given overriding authority and the delegations were nullified. Then the DPA redelegated back to the individual agencies the powers they originally had, completing the circle.

Fight Shaping Up

In office only 3 weeks, Economic Stabilization Administrator Eric Johnston appears to be heading toward his first big fight, involving his proposal for a labor-management conference to get the Government squared away on labor policies.

His suggestion so far has met with a cool reception from management, which is fearful that the conference would wind up in an attempt to have the Wage Stabilization Board take over the handling of labor disputes. In such a case, the board would first set wages and then determine whether disputes arising as a result of that action were well founded, and as a result would be constantly wavering back and forth.

At the same time, the possibility is seen that if such a conference was held labor would immediately demand the repeal of certain provisions of the Taft-Hartley Act.

Reciprocal Trade Program

State Department officials believe that the administration's reciprocal trade program, currently before Congress for extension, has played an important part in solidifying support of the United States in the United Nations by countries with which we have trade agreements.

It is pointed out as not entirely without significance that 38 of the 39 members of the United Nations with which this country has reciprocal trade agreements supported the United Nations action in Korea.

Department officials take the position that the common interests which these countries have with the United States in trade matters is a potent factor influencing their support of the U. S. in its fight against the spread of communism.

It is freely admitted that the administration didn't have anything like this in mind when the trade program was originally developed at a time when the League of Nations was still futilely trying to wave back the tide of aggression which led to World War II. But now they feel that countries which have learned to compromise their differences of opinion regarding trade matters are likely to line up together on more important issues.

(Ohio). A. A. Stambaugh, chairman of the board, said the firm is convinced of the necessity of conserving TEL for national defense, but is strongly opposed to the method proposed by the agency.

"Our recommendation to Deputy Administrator Bruce K. Brown is that instead of enforcing octane ratings the Government withhold, and stockpile for national defense, whatever amount of United States tetraethyl lead production is required for this purpose," he said, "and apportion the balance to United States refiners on an equitable basis, with special consideration for smaller companies upon whom allocation might effect a hardship more severe than would be the case with larger companies."

ESA Organization

Plan calls for separate oil and gas sections

WASHINGTON.—The Economic Stabilization Agency last week announced a tentative plan of organization, in which a separate branch will be set up in the transportation, public utilities, and fuel division to deal with petroleum, and to have a marketing section and a crude-oil and refining section. There will also be a transportation branch, with a storage and terminal-facilities section.

During the week the National Production Authority issued a number of additional control orders, as follows:

Order M-33, January 23: Establishing specific inventory limitations on molybdenum.

Amendment to Order M-8, January 23: Imposing end-use limitations on tin.

Order M-24, January 27: Imposing end-use restrictions on tin plate and terne plate.

Order M-25, January 27: Imposing limitations upon the amount of tin permitted in cans for various purposes, including lubricating oils and antirust compounds and other automotive supplies.

Order M-26, January 27: Imposing restrictions on the content and use of tinplate closures.

Order M-27, January 27: Imposing restrictions on the content and use of collapsible tin and aluminum tubes.

Amendment to Order M-20, January 29: Establishing inventory limitations for iron and steel scrap and subjecting it to allocation.

Amendment to Order M-16, January 31: Regulating the acceptance, delivery and distribution of copper and copper-base alloy scrap.

Direction 1 to Order M-12, February 1: Permitting readjustment of base-period use averages by producers and users of copper and copper base alloys in cases where operations were shut down for more than 15 consecutive days during the first half of 1950.

XUM

PAD Authority

Original order setting up agency gets revisions

WASHINGTON.—Authority of the deputy petroleum administrator was more clearly spelled out last week by Interior Secretary Oscar L. Chapman in an almost complete revision of Departmental Order No. 2591, setting up PAD last October 3.

As originally provided, but later changed because of legal questions, the secretary will serve as administrator and the deputy administrator will report directly and solely to him, it being specifically stipulated that, except with respect to certain responsibilities imposed on the Secretary of the Interior rather than the Petroleum Administrator, PAD "shall operate separately from, independent of, and outside the jurisdiction or authority of any officers or employe of the Department of the Interior except the secretary."

The effect of this provision will be to prevent any assistant secretary or other Interior official from exercising any control or authority over PAD in the absence of the secretary, and was one of the points most strongly pressed by industry representatives when the form of the agency was under discussion.

Details given.—The new order also goes into more detail than did the original with respect to the functions delegated to the deputy administrator, which are to include, but not be limited to:

"(a) The determination of requirements of various claimant agencies for petroleum and gas;

"(b) The allocation of petroleum and gas among said claimants and, under appropriate circumstances, to the public and industry in general;

"(c) The establishment of programs and policies with respect to the operation of the petroleum and gas industries;

"(d) The development with other appropriate governmental agencies of such arrangements relating to petroleum and gas as may be necessary with respect to industrial operations, materials, manpower, procurement, financing, loans, or other forms of assistance and the administration thereof;

"(e) The claiming on behalf of and the distribution to the petroleum and gas industries of such materials, facilities, and commodities as may be required in the operation of these industries;

"(f) The making of recommendations with respect to the issuance of Necessity Certificates for Accelerated Amortization pursuant to Section 124-A of the Internal Revenue Code;

"(g) The exercise of the powers and the performance of the functions respecting voluntary agreements and programs under Section 708(a) of the Defense Production Act of 1950;

Order issuance.—"(h) The issuance of petroleum and gas industry orders or directives;

"(i) The maintenance and implementation of all interagency relationships necessary for the efficient operation of the Petroleum Administration for Defense;

"(j) The exercise of the powers and the performance of the functions respecting loans, purchases, and commitments;

"(k) The requisitioning of property;

"(l) Matters of internal administration of the Petroleum Administration for Defense;

"(m) The creation and appointment of industry advisory committees or councils;

"(n) The power to redelegate any of the powers or authority delegated to him by this order."

It is provided, however, that all of these delegated functions are to be exercised "subject to the direction and control of the Petroleum Administrator and/or Secretary of the Interior.

NPC Committee Named

WASHINGTON. — A 24-man committee, to be headed by Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.), was set up last week by Walter S. Hallanan, chairman of the National Petroleum Council, to make the study of capital and materials requirements for increasing the availability of petroleum products requested by the Interior Department. *(The Oil and Gas Journal, February 1, 1951, page 30).*

The committee is to study and report on what would be required to provide an additional 1,000,000 bbl. daily of various products over the average production of the 3-month period ended January 31, entirely from Western Hemisphere sources. The increase would be spread over all products in such a way as to maintain the proportion of each during 1950, and the figures on requirements are to be presented in increments of 250,000 bbl. daily.

In requesting the study, Hugh A. Stewart, director of the Oil and Gas Division, pointed out that in the event of war "there will be need for a significant increase in the availability of petroleum products to meet military and civilian requirements" which would require heavy investments of capital and materials. Because of this factor, Hallanan declared "this is one of the most important assignments that the NPC has been called upon to undertake."

Senate O.K.s Further Study

WASHINGTON.—Extension to June 30 of the authority of the Interior Affairs Committee to investigate our fuel reserves and formulate a national fuel policy was voted by the Senate last week, but only after Committee Chairman Joseph C. O'Mahoney of Wyoming promised he would not ask for further time beyond that date.

O'Mahoney's investigation was one of a number threatened by the opposition of Sen. Allen J. Ellender of Louisiana to long-term investigations, which he showed the Senate are costing more than $1,000,000 a year. The Senate appropriations committee is making a study of investigations and is expected to recommend that the Senate revise its procedure and put strict limits on the expenditures of investigating committees.

O'Mahoney assured the Senate that he planned to wind up his fuel investigation by midyear. It was originally authorized August 15, with instructions to the committee to report by the end of the 1950 session, but the congressional campaigns and other matters made it impossible for the committee to do more than conduct some staff investigations.

Some Commodities Unfrozen

WASHINGTON. — The Office of Price Stabilization last week lifted the price freeze until April 1 on sales to the defense agencies or to suppliers with defense contracts of "commodities or services normally produced or supplied only for military use," after which the exemption will be limited to a group of specified products including aviation gasoline of 100 octane or higher.

Purpose of the action, formalized in Supplemental Regulation No. 1 to the General Ceiling Price Regulation, is to insure that price controls shall not interfere with the defense effort. Price Stabilization Director Michael V. DiSalle explained that the commodities involved "are of a strictly military nature, and the imposition of price ceilings upon them is not practical or advisable because of frequent changes of specifications or production plans, or because of variations in the conditions under which contractors and subcontractors operate."

PAD Refining Head Named

WASHINGTON. — Reid Brazell, president of Leonard Refineries, Alma, Mich., has been appointed director of the refining division of the Petroleum Administration.

Brazell, who was born in Grant County, Oklahoma, in 1905, has been engaged in the oil business since 1927 with Continental Oil Co., Allegany Oil Co., and the company he now heads. During the last war, he served on the District II PAW industry committee and for the past several years has been a member of the Military Petroleum Advisory Board as chairman of its refining committee for District II and a member of its refining panel.

Socony Progress

Jennings estimates gross crude reserves at end of 1950 were 3.8 billion barrels; firm's accomplishments cited

Dahl M. Duff

NEW YORK.—Socony - Vacuum Oil Co., Inc., at the end of 1950 had estimated gross crude-oil reserves of 3,830,000,000 bbl., B. Brewster Jennings, president, disclosed here last week.

Jennings, in an address before the New York Society of Security Analysts during which he set out his company's objectives and recalled its recent history and outstanding developments in its current operations, broke the reserve figure down, estimating that at the end of the year the firm had 1,500,000,000 bbl. of domestic crude reserves, and 2,330,000,000 bbl. of foreign crude reserves.

He estimated that the company's 1950 operations were as follows: Domestic—product sales, 194,340 bbl. daily; refinery runs, 172,800 bbl. daily; gross production, 75,600 bbl. daily. Foreign—products sales, 35,145 bbl. daily; refinery runs, 34,167 bbl. daily; gross crude production, 50,905 bbl. daily.

Basic policy.—Jennings said that since the merger of Vacuum Oil Co. and Standard Oil Co. of New York in 1931, the cornerstone of the company's policy has been and still is to do everything possible to strengthen its position in the vital field of crude-oil production. The company is seeking to achieve the best possible integration and would like to have refinery production not much less than sales volume and crude production from company properties represent a good proportion of refinery needs.

Jennings, however, made it clear that the company feels it is not possible for any large company to become completely integrated as to crude production, although he remarked he was not prepared to say what a satisfactory degree of integration is.

"I think we must expect that there will always be a substantial independent segment in the producing industry—indeed this seems to me to be desirable—and that the large companies should plan to continue to buy a goodly proportion of their needs from independent producers," he said.

Refining.—While the company considers additional crude production first on its list, it regards maintenance and improvement of manufacturing facilities as no less important. It was with this in mind that the company brought Eugene Houdry to this country to conduct his early experiments with catalytic cracking and became the first oil company to employ catalytic cracking commercially. Socony-Vacuum has carried on intensive research in this field the last 20 years.

In 1949, Socony-Vacuum perfected a much improved T.C.C. unit using air lift and the same year instituted a major program of replacing original static-bed units with the new type.

"Thanks to research and engineering developments, construction costs of these latest T.C.C. units is no greater than the cost of constructing the earlier fixed-bed unit prior to the last war, notwithstanding the inflation since that time," Jennings commented.

Actual capital cost of one of these 15,000 bbl. daily air-lift T.C.C. units is currently about $3,750,000. Two of them have gone on stream at Beaumont *(The Oil and Gas Journal, January 25, 1951, page 168)*, and one at Trenton, near Detroit while others are under construction at Beaumont, Buffalo, Augusta, East Chicago, Brooklyn, Paulsboro, and Frontignan, France.

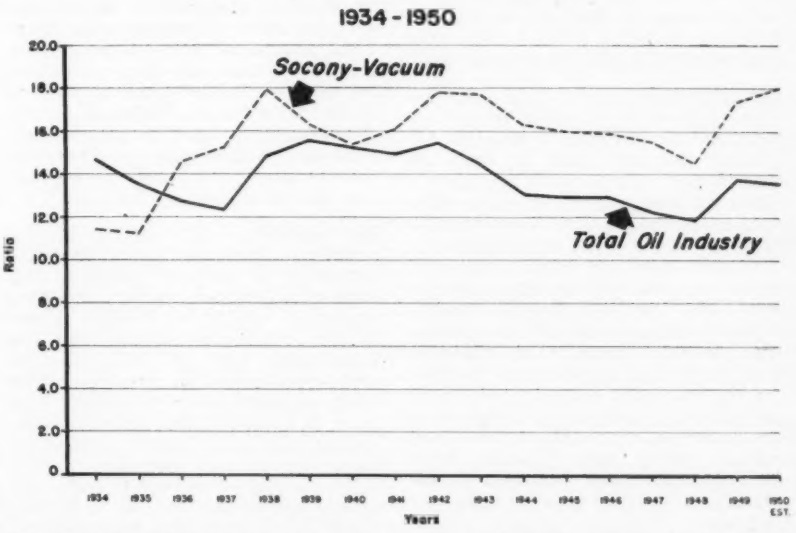
On December 31, 1950, net book value of Socony-Vacuum's refining investment was about $150,000,000. Total refinery capacity is about 540,000 bbl. daily. If the company were to build refineries today to produce the same capacity, it would cost between $1,000 and $1,500 a barrel of daily throughput.

Offshore leases.—The decision to invite Newmont Mining Corp. and Continental Oil Co. to participate in the Magnolia program in the Gulf of Mexico was based on the fact that the company found testing and development of all its leases in the time available before expiration would tax it beyond what it considered appropriate to spend.

"The fact that we have had some successes in finding oil and gas on these tidal lands does not make us regret having sold part of our position," Jennings said. "These offshore developments are expensive, they are rather new, and I personally am satisfied that it is better to let others come in, than to try to go it alone. The point is debatable, of course, but it is our view that the law of averages has a better chance to work if one has, say, a half interest in 50 fields than 100 per cent in 25."

Natural gas.—Socony - Vacuum has carried its natural-gas reserves at 7 trillion cubic feet for several years. This includes only a small percentage of dissolved gas reserves. The company is including smaller gas reserves

RATIO OF U. S. RESERVES TO CURRENT PRODUCTION
(Includes Crude-Oil and Natural-Gas Liquid)



This chart shows United States reserves in terms of year's supply compared with those of one of the industry's larger companies—Socony-Vacuum Oil Co., Inc. Since the early 30's, the company has laid emphasis on the development of additional reserves and production. The dip in the company's reserve position in 1939 and 1940 was due to the rapid depletion of the then-new fields in Illinois. The 1948 decline of both the industry and the company resulted from the all-out production in that year to meet the shortage.

in the total as time permits the necessary engineering data to be gathered. The company estimates its income from natural gas and natural-gas liquids at $12,700,000 in 1950 against $2,828,000 in 1940.

Field development.—John C. Case, director in charge of production, commented that the cost of getting a daily barrel of crude production in the Mid-Continent area is $2,400 on the basis of production under allowables as they were last autumn. The cost figures include drilling and lease equipment.

The company drilled about 700 development wells last year. There will be a few less this year, but the effort will be the same, that is, the wells will be deeper. The company expects to add about 24,000 bbl. of producing capacity as a result of the drilling. The resulting net total capacity, of course, must exclude declines and abandonments.

Equipment Outlook

Oil operators becoming more confident that their needs will be met through administrative plans now in works

ASSURANCE that the petroleum industry will be able to obtain sufficient equipment and supplies through administrative procedures now being perfected in Washington is growing among oil operators as a result of reports from those who attended the meeting of the National Petroleum Council last week and other conferences and committee meetings in the capital.

Typical of these reports are those being received by members of the Petroleum Equipment Suppliers Association in various oil centers and from oil-company purchasing agents who have conferred with officials of the Petroleum Administration for Defense and the National Production Authority.

It may be several months, according to these reports, before procurement procedures can jell into formal orders and a smoothly running system, but in the meantime there is every reason to feel that the oil industry is in better position than most big users of critical materials.

Enough tubular goods.—The assurance already given by Washington authorities that there will be enough oil-country tubular goods to drill approximately 44,000 wells this year is being backed up by action to allocate sufficient steel to the pipe mills to keep them operating at capacity. This will eliminate conversion deals, which at best were an expensive and round-about method of obtaining pipe.

The tubular goods will be distributed through regular trade channels, with a pool of 5 per cent reserved for real hardship cases, and the present plan is to put the oil industry on its honor to stay out of the black market, which will eliminate much of the paper work involved in the allocation system used during the last war.

Schedules asked.—Beginning with third-quarter operations, according to present plans, oil companies will be asked to submit schedules of their drilling operations, giving areas where wells will be drilled and comparisons with their actual 1950 drilling. Approval of these programs by PAD will constitute authorization to purchase the needed equipment from supply stores, and the supply stores in turn can use this approval to justify their orders on the pipe mills and other manufacturers.

Present thinking in Washington, it is reported, is not to impose any federal well-spacing regulation, such as was used by the Petroleum Administration for War, but to rely on the industry following the prevailing spacing regulations of state regulatory bodies.

Allocation.—Allocation of basic steel to manufacturers of other materials for the oil and gas industry has not progressed as far as the tubular-goods program, but is being pushed actively, it is understood. Surveys made for the NPC already have provided reasonably accurate figures as to tonnages required for construction of pipe lines, refineries, natural-gasoline plants, and similar installations, and fabrication and distribution will be handled in the same way as tubular goods unless defense authorities should institute a general controlled-materials plan or other allocation system applicable to all steel fabricators.

Big problem.—One of the greatest problems facing equipment manufacturers at present is obtaining supplies of aluminum, copper, and other materials which have been placed under curtailment orders, and also components such as valves and instruments normally purchased from other manufacturers. The PAD, however, is aware of this and has asked equipment manufacturers to supply it with lists of such materials together with the names of the normal suppliers, quantities needed, and "lead time" or usual delay between placing an order and securing delivery.

Oil operators already are running into occasional difficulty in obtaining such miscellaneous materials as cement, well acid, mud chemicals, and spare parts. In many such cases, however, they have found that PAD, while still not fully staffed, has been able to take care of real hardships on an emergency basis.

Oklahoma Raises Allowable

OKLAHOMA CITY.—The State Corporation Commission has raised the state's crude-oil allowable to 499,905 bbl. daily for February. This compares with 488,900 bbl. daily permitted during January.

Bureau of Mines estimated demand would be 483,000 bbl. daily.

A.A.P.G. Election

Morgan of Richfield Oil named president of group

FRANK A. MORGAN, vice president and manager of exploration for Richfield Oil Corp., Los Angeles, has been elected thirty-fifth president of the American Association of Petroleum Geologists by mailed ballot, in which 7,800 members participated.

Morgan and other new officers will be installed at the conclusion of the association's thirty-sixth annual meeting in St. Louis April 23-26. A.A.P.G. is the largest organization of geologists, and is headquartered in Tulsa.

Other officers elected include: Lewis G. Weeks, Standard Oil Co. (N. J.), New York City, vice president; Robert H. Dott, Oklahoma Geological Survey, Norman, secretary-treasurer; and Kenneth K. Landes, University of Michigan, Ann Arbor, editor of the monthly A.A.P.G. Bulletin.

Retiring officers.—Retiring officers are: C. L. Moody, division geologist, Ohio Oil Co., Shreveport, president; John Emery Adams, geologist, Standard Oil Co. of Texas, Midland, vice president; Henry N. Toler, manager, geological and land department, Southern Natural Gas Co., Jackson, secretary-treasurer; and Alfred H. Bell, head of the oil and gas division, Illinois State Geological Survey, Bulletin editor.

Morgan, a native of California, studied geology at the University of California, and graduated from Berkeley with an A. B. degree in 1920. He formerly was associated with E. A. Starke, chemist and petroleum engineer of Los Angeles, and Rio Grande Oil Co. before joining Richfield.

Weeks, chief research geologist for Jersey Standard, is a native of Wisconsin and a graduate of the University of Wisconsin, holding an A. B. degree in geology. Dott, a native of Iowa, is a graduate of University of Michigan, where he received a B. S. degree in forestry, and an A. M. degree in geology, and Landes is a native of Seattle. He is a graduate of University of Washington, with a B. S. degree in geology.

Alberta Gas Line

Proponents of artery from province to Pacific Northwest think it will be authorized despite ban on export of gas

Dahl M. Duff

SOME proponents of a gas line from Alberta to the Pacific Northwest feel that the project will be authorized as a necessary defense measure, despite the unfavorable decision of the Alberta Petroleum and Natural Gas Conservation Board *(The Oil and Gas Journal, February 1, 1951, page 35)*.

To back up this view, they point out the increasing fuel needs of the Pacific Northwest and the fact that a gas line from Alberta would relieve some of the pressure on California oil production which supplies the region.

The Munitions Board of the U. S. Government is interested in the project, and C. D. Howe, head of the Department of Trade and Commerce of the dominion government, earlier told the Alberta authorities that their decision on gas export would influence the decision in Washington on authorizing the projected gas line from Texas to the Pacific Northwest.

E. C. Manning, Alberta premier, in his statement accompanying release of the board report, indicated the provincial government might authorize gas for the line if it were determined in Washington and Ottawa that 'it is urgently needed for defense. He said the people of Alberta are ready and prepared to play their full part in any program necessary for the security of the continent.

Insufficient reserves.—The report of the Petroleum and Natural Gas Conservation Board held that Alberta's gas reserves are not now sufficient to permit movement outside the province. At the same time, it did not completely close the door to export in the not-too-distant future.

It recommended that gas-field development be encouraged and said that if a successful trend is established, it would be prepared to consider export based on a "lesser degree of provincial protection." The various applications for gas exports were continued until September 4 with provision for reopening earlier if new evidence is developed.

Westcoast's policy.—Frank McMahon, president of Westcoast Transmission Co., Ltd., one of the applicants to build a line to the Pacific Northwest, said the decision is not in conflict with his company's plans since Westcoast would take gas from the area in the northwestern part of the province which the board said is beyond the economic reach of Alberta consumers. In a statement in Calgary, McMahon said:

"It has always been the policy of Westcoast to take gas from the area in the northwestern portion of the province which the conservation board said is beyond the economic reach of Alberta consumers."

Therefore, the company's plans do not interfere or conflict in any way with the gas requirements of the province or the findings of the board, as the only market for the natural gas found in the northwestern area of Alberta—and in the adjoining northeastern area of British Columbia—is the export market of the Pacific Northwest.

He said he was in complete agreement with the findings of the conservation board in setting aside the present proven reserves of Central and southern Alberta to meet requirements of Alberta consumers for the next 30 years. This action, he stated, follows closely the recommendations submitted on behalf of Westcoast by its engineers and geologists when dealing with the problem of Alberta requirements and assured supplies.

Exploration encouraged.—Of particular interest in the board's report was its proposal to amend the present system of disposal of crown lands to encourage exploration and development of gas reserves. It said it felt the present system was equitable for oil but not suited for gas development since larger blocks are required to make the work attractive. It suggested that "gas only" rights be made available in specific zones for exploration and lease in large blocks on a drilling-performance basis.

The board conceded there would be problems in working out such a "gas only" plan but commented that the present policy of one well per 640 acres "coupled with diversification of ownership through establishment of crown reserves on a checkerboard basis makes it difficult for a company considering developing gas to acquire sufficient acreage at reasonable cost to make the project worthwhile." In regard to this part of the report, Premier Manning said the government is amending its gas-exploration and leasing regulations along the lines recommended.

Reserves estimated.—The board found Alberta's present reserves of natural gas to be 4,658 million cubic feet, including 219 million cubic feet beyond economic limit of utilization. The various applicants for export projects had submitted reserve estimates ranging up to more than 7,000 million cubic feet. The board estimated the requirements of the province through 1980 at 3,059.9 million cubic feet. This provincial requirement is mainly in the needs of the two major utility systems, Canadian Western Natural Gas Co., and Northwestern Utilities Co.

The report also urged that facilities for storing Alberta gas be developed in order to balance out withdrawals. It said the ideal way to supply Alberta requirements would be to meet the peak load from economically available dry-gas fields and the base load from oil and condensate fields. Alternatively, it said oil and condensate-field gas could be used with adequate summer storage.

Proposals rejected.—Among the proposals rejected in the report was one of McColl-Frontenac Oil Co., Ltd., and Union Oil Co. of California to export gas from four small fields in southern Alberta into Montana. Authorizing this project, the board said, would be contrary to the policy of preference to Canadian consumers and also would lose to the province a valuable source of peak-load gas as well as possible storage reservoirs. It said none of the major reserves could be allocated to the export market, and that while scattered reserves in the northwest, east, and southwest sections could be classified as outside economic reach of the two major utility systems of the province, they are not large enough.

Horizons Unlimited

Canada has most to offer fortune seeker, Porter says

CALGARY.—Canada today is probably the most promising nation in the world for those seeking their fortunes because of the continued progress of its oil industry under a government policy favorable to private enterprise, Frank M. Porter, president of the American Petroleum Institute, told the annual meeting of the Western Canada Petroleum Association February 1.

"I can think of no other time when private American capital has flowed so freely and from so many sources into another nation without hesitancy," declared Porter, adding that oil men have invested their funds as freely here as they would have had an oil show been made in Iowa.

No monopolies.—The Canadian Government, as the owner of extensive mineral rights, has not followed the

trend in South American countries to promote a governmental monopoly. Instead it has encouraged the entrance of private capital and has concentrated on developing regulatory and conservation measures concerned with the physical aspects of the petroleum industry, he said.

The feverish activity and rivalry in Alberta at the present time is due to a vigorous competitive spirit, "but the story must be told and retold for, curious as it may seem, success produces its own jealous opposition inspired by the inborn ambition of some to manage the affairs of others," the A.P.I. president stated.

Rare opportunity.—The development of Canadian oil is presenting a rare opportunity for oil men to watch a new industry spring from infancy to maturity within an economy that is already well developed, and coupled with this is the timely fact that this new oil industry will bulwark the United Nations' war potential in this uncertain world, he said.

Sarnia Pipe Line Finished

SARNIA, Ont.—Construction of the 8-in. pipe line for Susquehanna Pipe Line Co. from Toledo to Sarnia has been completed.

The line connects the Sun Oil Co. refinery at Toledo with the Polymer Corp. plant at Sarnia and will handle light hydrocarbons used in the production of synthetic rubber.

Program to Cost $14,000,000

Imperial Oil, Ltd., has announced that the expansion program at its Sarnia, Ont., refinery will cost in the neighborhood of $14,000,000. The project, announced 3 weeks ago, will add a 46,500 bbl. per day combination atmospheric and vacuum crude-distillation unit and a 23,500 bbl. per day fluid catalytic cracking unit, together with light-ends recovery facilities. Each of these units will be the largest of their type in Canada.

The new crude unit will permit the retirement of some existing crude-distillation capacity at Sarnia, and at the same time will increase the total crude throughput capacity of the refinery from 55,500 to 71,000 bbl. per day, to establish by a wider margin the refinery's position as the largest in Canada.

Augmenting an existing 23,000 bbl. per day Suspensoid catalytic cracking unit, the new fluid plant will increase the refinery yield of high-octane gasoline, distillate fuels, and L.P.G. The Suspensoid unit at Sarnia was the first catalytic cracking unit in Canada and is the only one of its type in existence. Catalytic cracking capacity at Sarnia will total 46,500 bbl. per day when the project is completed, probably at the end of 1952. The fluid unit is of a new modified design developed by Standard Oil Development Co.

GULF COAST

Tidelands Refunds

Payments to U. S. by Gulf operators will be refunded if Congress fails to provide for federal control of areas

WASHINGTON.—Rental, royalty, and other payments on tidelands operations in the Gulf of Mexico deposited with the Interior Department under the terms of the notice issued by Secretary Chapman December 11, following the Supreme Court's denial of rehearings of the Texas-Louisiana cases, will be refunded if Congress fails to provide for federal administration of the submerged lands by December 11, 1952, it was announced last week.

The announcement was made in an amendment to the notice, which authorized continuation for a 60-day period of oil and gas operations then being conducted, conditioned upon payment to the department of the royalty, rent, and other payments required under state leases.

In that notice, no hint was given of the eventual disposition to be made of these payments in the event Congress steadfastly refuses to provide for federal administration, but that question, as well as doubts about payments on leases eventually held to be on state lands, are disposed of in the amendment.

Provisions.—The revised notice provides that in the event all or any part of the area covered by a state lease should be determined to be above the ordinary low-water mark or within navigable inland waters, payments tendered with respect to such area will be refunded.

"If the United States should fail to provide within a period of 2 years from December 11, 1950, for the granting to the person making such a tender of the right to conduct oil and gas operations on the land covered by the state lease, under provisions substantially equivalent to those of the state lease," the notice continued, "the sum so tendered and held under paragraph (c) above will be refunded upon the request of the person who tendered it, unless (1) such person shall have accepted a grant from the United States of the right to conduct oil and gas operations on the land under provisions different from those of the state lease, or (2) such person shall have failed to tender to the Secretary of the Interior, during the 2-year period, a further payment required under the provisions of the state lease."

Paragraph (c) referred to above provides that remittances will be deposited in a special account in the Treasury pending action by Congress respecting final disposition of the tidelands.

No benefits.—Chapman made it clear in his original notice that operators would derive no benefit beyond the right to continue operations by reason of their payments to the Government, stipulating that the acceptance of remittances by the department "will not amount to, or have the effect of being, an adoption, confirmation, ratification, or validation of the state lease by the United States and will be without prejudice to any rights of the United States," and, further, that "the Secretary of the Interior will not grant, in return for such payment, any right to inaugurate operations for the discovery and production of oil or gas within the area of submerged coastal lands covered by the state lease, or any other right respecting such land."

Voluntary payments.—Despite this limitation, however, it was learned, voluntary payments of rentals on leases on which no operations were taking place December 11 are being submitted, apparently in the hope that Congress might take the payments

Building Purchased

Tennessee Gas Transmission Co. has purchased the 22-story Commerce Building in Houston from the Jesse H. Jones Interests for $11,000,000. The firm now occupies three floors of the newly constructed annex and two floors of the building proper, and will expand into other sections as space becomes available.

into account in deciding whether such leases should be recognized if the O'Mahoney bill for interim federal administration is enacted.

The 60-day period of continued operation provided for in the notice will terminate shortly, and it is expected the department will announce a short extension, probably 30 days. This action will be necessary because of delay in drafting the terms of the agreement which the department said would be offered operators desiring to continue operations beyond the 60-day limit and until Congress acts one way or the other on the O'Mahoney bill.

Warning Issued

Hallanan urges Congress to act on tidelands case

WASHINGTON. — Unless Congress act soon, oil exploration and drilling activities in the Gulf of Mexico will stop completely, Walter S. Hallanan, president of Plymouth Oil Co., said in a letter to Sen. Joseph C. O'Mahoney, chairman of the Senate committee on interior and insular affairs, which is considering tidelands legislation.

Hallanan stated that both exploration and drilling have been curtailed sharply, and that the number of geophysical crews working in the gulf has decreased from 48 to 5. In addition, the number of drilling rigs in operation has dropped from 29 to 9.

He pointed out that when the nine wells now drilling are completed there will be no further drilling efforts in the gulf due to the order of the secretary of the interior forbidding completion of any wells started after December 11, 1950. This was the date of the U. S. Supreme Court decree in which operators were enjoined from further activity.

Comes at bad time.—Hallanan said the sharp curtailment of exploration and development in the gulf comes at a time when the demand for increased crude-oil production is "so closely related to our national security."

"It seems tremendously important," he wrote, "that some action be taken which would permit the resumption of exploratory and drilling operations in the tidelands area at the earliest possible time."

Results.—Hallanan wrote that oil operators hold leases issued by Texas and Louisiana covering 1,549,987 acres of submerged lands along the coast. A total of 233 wells have been drilled in the area to date, he told O'Mahoney. These resulted in 89 oil wells, 28 gas-condensate wells, 4 dry-gas wells, and 112 dry holes.

Total gulf production, according to Hallanan, was 8,375,877 bbl. up to December 1, 1950.

WEST COAST

CALIFORNIA ROLLER-COASTER.—Above is an aerial view of construction on Richfield Oil Corp.'s new 14-in. crude-oil line running from the San Joaquin and Cuyama valley fields of California to the Los Angeles area. Some of the 112-mile route was laid over plains, but this portion, resembling a giant roller-coaster from the air, was laid "over the hump" in the mountain area.

Crude Line Finished

Richfield now using new 112-mile, 14-in. carrier

LOS ANGELES.—Richfield Oil Corp. has completed the final section of its new 112-mile, 14-in. crude line which connects the company's production in the San Joaquin and Cuyama Valley fields with the Los Angeles area.

The line, constructed to assure economical and dependable transportation for the company's increasing oil supplies from the valley areas, will aid in meeting growing demands of the Armed Forces, Richfield announced. Completion of the last 54-mile stretch between Wheeler Ridge pumping station and Newhall, Calif., marked end of the construction project which started 15 months ago and cost $7,000,000.

The line roughly parallels an existing 125-mile, 10-in. line from Buena Vista Lake pumping station, 7 miles east of Taft, which was completed in 1925. The new 14-in. line has a rated capacity of 75,000 bbl. daily, bringing total delivery capacity of the company to 105,000 bbl. daily. Both lines terminate at Richfield's Watson refinery.

The initial 58-mile section of the new line between the refinery and Newhall was completed a year ago. Work on the final 54-mile link between Wheeler Ridge and Newhall was started last October by Engineers Limited Pipe Line Co.

Pumping stations.—Two new pumping stations at Wheeler Ridge and Tejon provide power for moving the crude. Each station is equipped with three 1,050-hp. supercharged dual-fuel diesel engines, one of which will serve as a standby-power unit at each station. The engines are designed to operate either on natural gas or fuel oil, and can be switched from one fuel to the other at will.

Company engineers pointed out that the new line has been designed for maximum efficiency, with walls of the pipe varying in thickness. Walls are heaviest where greatest pressures prevail, affording considerable savings in steel. Sectionalizing gates, installed on either side of all major stream crossings and at other critical points in the line, will prevent loss of oil in event of line failure. The line was designed and constructed for operation of scrapers, and is protected by Bitumastic coating.

Contractors on the line, in addition to Engineers Limited, were J. E. Young Pipe Line Contractor, Inc., and Alex Robertson Co.

Richfield's total pipe-line system now aggregates a total of 714 miles.

Purchase Contract Signed

LOS ANGELES.—A long-term arrangement to purchase crude oil to be produced by North American Consolidated Oil Co. and Jergins Oil Co., from San Ardo field in Salinas Valley, California, has been entered into by General Petroleum Corp.

The field, discovered in 1948, has about 40 wells, but there has been only a limited market for the crude due to the fact that there have been no economical transportation facilities to move it.

General Petroleum will provide the facilities by moving its Lebec-to-Mojave pipe line, complete with pumping stations and tanks, to the new location. This line was built primarily to supply the Santa Fe Railroad with fuel oil at Mojave. Because the railroad has replaced steam engines using fuel oil with modern diesel engines, the pipe line to Mojave has been idle for the past few years.

New Terminal Proposed

VENTURA, Calif.—Plans for the construction of a tanker and distributing terminal on a 12-acre site just south of Ventura were announced here last week by Union Oil Co. Its proposal will be discussed at a public hearing of the Ventura County Planning Committee on February 7.

If the permit is granted Union will erect about 200,000 bbl. of storage at the site, which is near the mouth of the Santa Clara River. Bulk of the tankage will be for crude, which will be transported from its station at Santa Paula. To accomplish this the company will construct a 10-mile line from the terminal to Saticoy; a line already exists from Saticoy to Santa Paula.

An undersea loading line will be laid from the terminal to an offshore deep-water loading point. Tanker-loading facilities will include two 6,000 bbl. per hour diesel-powered pumps.

Plant Bids to Be Asked

LOS ANGELES.—Standard Oil Co. of California, operator of the Elk Hills Naval Reserve unit in the San Joaquin Valley of California, shortly is expected to ask for bids on a 100,000-M.c.f. natural-gasoline plant to be built in that "moth balled" field. Standard reportedly is in the process of drawing up plans and specifications; when completed bids will be sought.

Initial operating capacity of the plant is expected to be in the vicinity of 50,000 M.c.f. It is believed, however, that equipment will be sized so that the plant can be readily expanded to 100,000 M.c.f. through the installation of additional compressor capacity.

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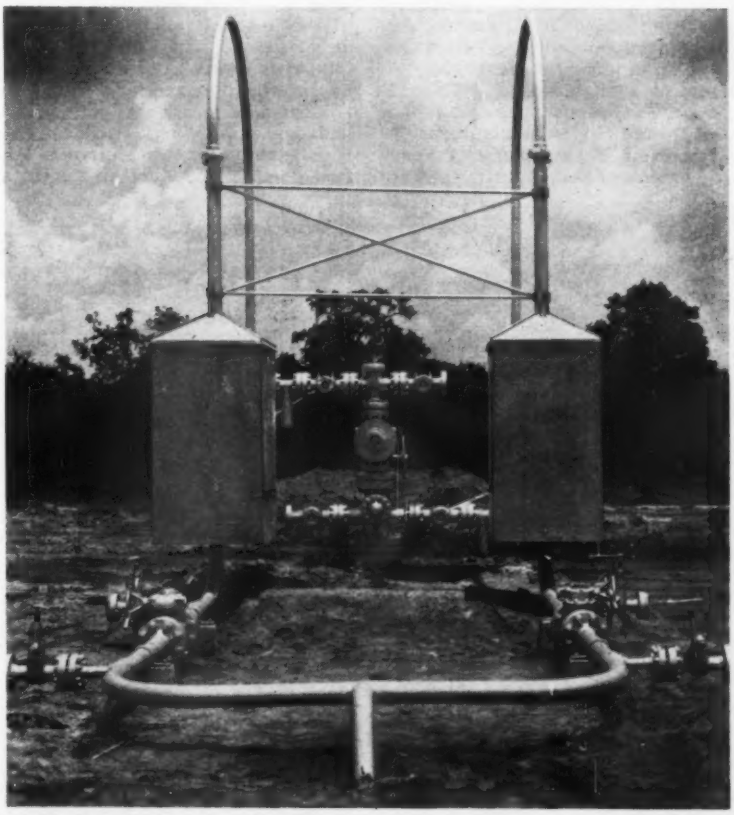

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Purchase Contract Signed

LOS ANGELES.—A long-term arrangement to purchase crude oil to be produced by North American Consolidated Oil Co. and Jergins Oil Co., from San Ardo field in Salinas Valley, California, has been entered into by General Petroleum Corp.

The field, discovered in 1948, has about 40 wells, but there has been only a limited market for the crude due to the fact that there have been no economical transportation facilities to move it.

General Petroleum will provide the facilities by moving its Lebec-to-Mojave pipe line, complete with pumping stations and tanks, to the new location. This line was built primarily to supply the Santa Fe Railroad with fuel oil at Mojave. Because the railroad has replaced steam engines using fuel oil with modern diesel engines, the pipe line to Mojave has been idle for the past few years.

New Terminal Proposed

VENTURA, Calif.—Plans for the construction of a tanker and distributing terminal on a 12-acre site just south of Ventura were announced here last week by Union Oil Co. Its proposal will be discussed at a public hearing of the Ventura County Planning Committee on February 7.

If the permit is granted Union will erect about 200,000 bbl. of storage at the site, which is near the mouth of the Santa Clara River. Bulk of the tankage will be for crude, which will be transported from its station at Santa Paula. To accomplish this the company will construct a 10-mile line from the terminal to Saticoy; a line already exists from Saticoy to Santa Paula.

An undersea loading line will be laid from the terminal to an offshore deep-water loading point. Tanker-loading facilities will include two 6,000 bbl. per hour diesel-powered pumps.

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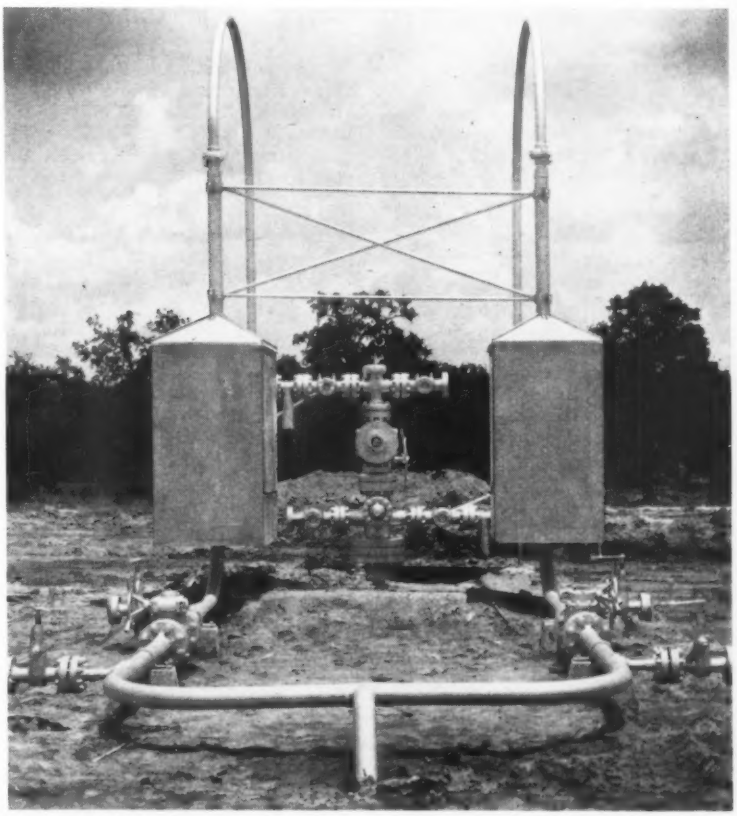

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MIDDLE EAST

Russian Bottleneck

If Reds took over Middle East oil in event of war, they couldn't utilize it for several years, Socony head says

Dahl M. Duff

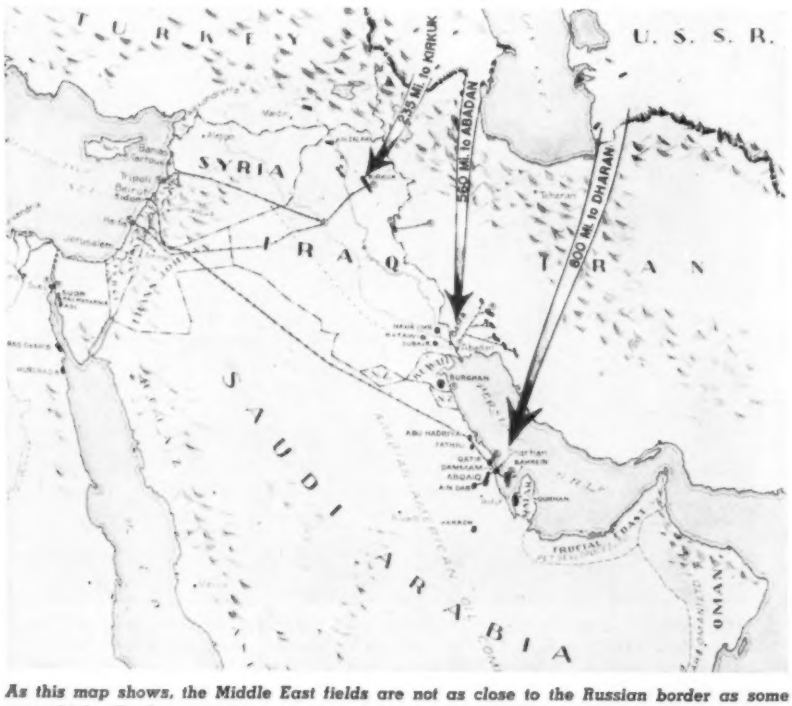
SHOULD Russia be successful in capturing the oil fields of the Middle East in the event of war, she could not utilize the oil for at least several years, B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., said last week in New York.

This is because there is no way by which this oil can be transported up into Russia. Jennings said he supposed in a war Russia would make every effort to deny Middle East oil to the United States and its allies but that it does not seem likely Russia would go after it as a means of augmenting her own oil resources.

These comments on the vulnerability of the Middle East were made incidental to a discussion of all phases of Socony-Vacuum's operations, both in the United States and abroad, before the New York Society of Security Analysts. *(See Industry Affairs in this issue.)* Socony-Vacuum has 10 per cent interest in Arabian American Oil Co. and slightly less than one-eighth in Iraq Petroleum Co., Ltd.

Anxiety.—"Whether an area is vulnerable depends, it seems to me, primarily on how anxious the enemy is to take it and how anxious we and our allies are to defend it," Jennings said. "On the matter of the defense of the Middle East, I would point out only the very large distances which are involved, and also call attention to the big range of mountains which lies in Persia north of Abadan and then the great area of desert south of the head of the Persian Gulf and west of it.

"Anyone who has seen this country appreciates that overland supply lines are extraordinarily difficult and that logistical supply by sea has tremendous advantages. No army could support itself in the Arabian desert, and I doubt equally whether it could in the Persian mountains."



As this map shows, the Middle East fields are not as close to the Russian border as some may think. Furthermore, between them and Russia are difficult mountains and deserts. The map was used last week by B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., in a talk in New York in which he pointed out that even if the Russians captured the Middle East fields, they would be unable to move the oil to their country for at least several years.

Socony interests.—As for Socony-Vacuum's own individual interests in the Middle East, Jennings said that the company expects within the next couple of years to be receiving crude oil at the rate of 144,000 bbl. daily as a result of its purchase into Aramco and the increased development of Iraq Petroleum.

Data presented by the Socony-Vacuum president showed its crude reserves in the Middle East—Iraq, Saudi Arabia, and Egypt—at 2,198,000,000 bbl. Its 50 per cent share of Standard-Vacuum represents reserves in Indonesia amounting to 165,000,000 bbl.

Jennings said it is necessary to appraise foreign reserves with caution. For one thing, reserves abroad cannot be calculated with the same degree of precision that they can in the United States because in general very large structures are produced by a small number of widely separated wells.

Reserves information.—"In the past, we have not wanted to show these foreign reserves at all, primarily because a number of these foreign operations are in concessions which run for a specified period of time and not unlimited," he said. "There is always a question as to how much oil can be produced during the life of the concession, as compared with the amount of oil actually in place. In recent years as the production of some of the more important fields, particularly in the Middle East, has increased, there is some reason to believe that the bulk of the now proved reserves could be produced during the remaining life of the concessions, and so these figures have, perhaps, more significance now than they would have had 4 or 5 years ago."

Middle-East Crude Used

Cie. Francaise des Petroles, which through an affiliate, controls two of France's largest refineries, is now obtaining all its crude-oil requirements from the Middle East.

The company has terminated contracts under which it has since January 1947 been buying much of the Mulata and Roble, Venezuela, production of Pantepec Oil Co., C.A. Prior to termination of the agreement, the sales amounted to about 12,500 bbl. daily. Pantepec is now reported to be selling about 5,000 bbl. daily of this oil to an American company under contract, and disposing of the remainder on the spot market.

Cie. Francaise partially owned by the French Government, has a 23.75 per cent interest in Iraq Petroleum Co., Ltd., and under the revised

agreement of 2 years ago among the I.P.C. partners, the French were guaranteed access to more Iraq oil as needed. Cie. Francaise des Petroles holds 56.8 per cent of Cie. Francaise de Raffinage which operates refineries having capacity equal to 33 per cent of total French refining capacity foreseen under the Monnet Plan.

In 1949 C.F.P. received about 16,240 bbl. daily from I.P.C. and 12,250 bbl. daily from Pantepec. It was estimated recently in Paris that the company would receive 31,000 bbl. daily from the Middle East in 1950 and in 1951, 40,000 bbl. daily, plus 30,000 bbl. daily if the Haifa-Kirkuk line should be opened.

LATIN AMERICA

Labor Talks

Venezuelan negotiations may come to a head soon

LABOR negotiations now being conducted by the oil companies in Venezuela are expected to come to a head in the near future.

Venezuelan Government authorities are reported to be discussing the issues with the operating companies on behalf of the workers. Some compromise between the positions of the companies and the demands of the labor groups is anticipated.

The military-junta government in Venezuela dissolved the old oil-labor syndicates following the week-long strike last May which almost completely shut down the industry. This action was taken on grounds some of the syndicates were Communist or allied with the outlawed Accion Democratica party.

New unions have been organized, and are understood to have gained considerable strength. The new group called the Independent National Oil Workers Committee claimed recently to represent the 50,000 workers in the Venezuela industry.

Demands presented.—It is reported 15 demands were presented to the companies. The existing contracts were signed in the early part of 1948, effective 3 years but subject to reopening at the end of 2 years.

The demands on the companies are reported to call for a 2-bolivar wage increase for common labor, and an approximately 10 per cent raise for other categories. (Three bolivars approximately equal $1). The other demands relate to broadened commissary privileges with more favorable commissary prices, medical attention including that for dependents, and other of the so-called fringe benefits.

Basic wage.—The basic wage in the Venezuelan industry has been the equivalent of $5.82, but it has been calculated that the various other benefits bring the total cost per man per working day in Venezuela to nearly $16. These include such items as indemnities, medical benefits, bonuses, rest days, overtime, travel allowances, training recreation, and schools. Costs of living, however, are extremely high in Venezuela, due largely to the fact that the country depends heavily on its petroleum industry and imports much of the other necessary commodities.

Carries Middle East Oil

Expanding oil production from the Persian Gulf is transported in outsized facilities to new refineries of Europe, and this view of Shell's "Velutina," tied up at the Mena al Ahmadi jetty after its maiden voyage from the United Kingdom, is becoming common. The vessel was the first 28,000-ton supertanker to be launched from European shipyards. The Ahmadi jetty, completed a year ago by Kuwait Oil Co., Ltd., extends 4,140 ft. from shore and is one of the largest in the industry. The jetty is fitted with new-type fenders consisting of concrete-filled cylinders which absorb the shock by an inward and upward movement. (Shell photo.)

New Test Planned

Texas Petroleum to drill well in northern Falcon

TEXAS PETROLEUM CO. is reported to be moving in equipment for an early test on the property in northern Falcon, Western Venezuela, which it recently acquired from Creole Petroleum Corp.

The medium-depth test will be located near the coast in the eastern part of the area. The company is using a converted former naval landing craft to move in some of the necessary material and housing.

The area on which Texas Petroleum acquired concession rights from Creole consists of 151,000 hectares in Buchivacoa, Falcon. It is on the mainland to the south of the western edge of the Paraguana Peninsula.

Coro purchase.—Texas Petroleum also recently bought out the inactive Coro Petroleum Co., thus acquiring an additional 18,000 hectares located to the east of the former Creole acreage. Coro was owned one-half by Richmond Exploration Co., one-third by Sun Oil Co., and one-sixth by Esso Standard Oil Co. The Esso interest was originally acquired by Colonial Beacon Oil Co., another Standard Oil Co. (N. J.) affiliate which Esso succeeded.

The Coro property included four shut-in wells comprising the old Urumaco field. These shallow wells with an estimated potential of about 1,000 bbl. daily of 32°-37°-gravity crude have not been commercially produced.

Crude line.—The tracts taken over by Texas Petroleum are traversed by the projected 30-in. crude line to be built by Shell from the Lake Maracaibo Basin area to Cardon and the Las Piedras terminal on Paraguana Peninsula. Texas Petroleum and Mene Grande Oil Co. have interests in this project. Work on the line is expected to be started in the next 2 or 3 months by Williams Brothers de Venezuela, which has the contract.

Oil Exports Set Record

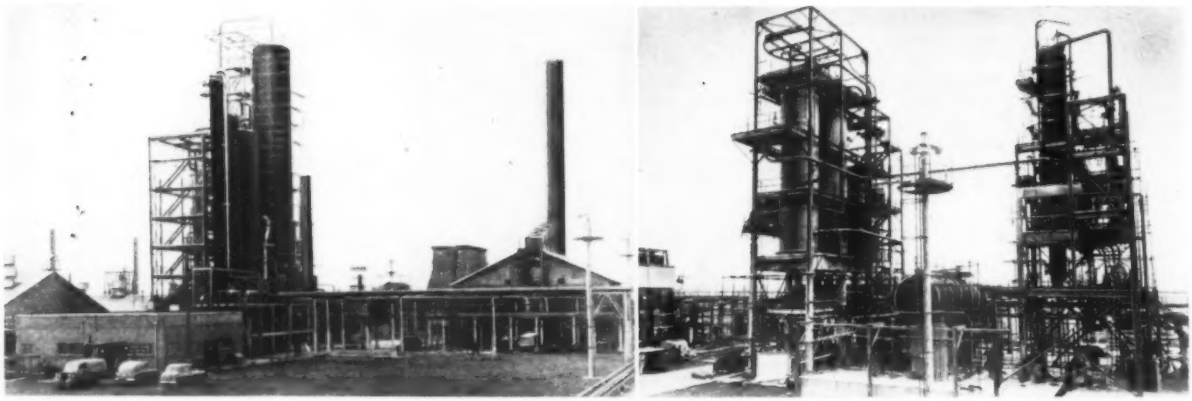
Exports of crude oil from Colombia in 1950 reached a record-breaking total of 28,268,872 bbl., or an average of 77,450 bbl. daily.

Average value of the crude exports was $2.28 a barrel, for a total of $64,467,221. The high level of exports reflected Colombia's record 1950 production which totaled 33,973,214 bbl., or an average of 93,077 bbl. daily.

The 14.7 per cent increase in crude output over 1949 was made possible largely by the installation of additional pumping facilities on the Andian National pipe line to the Caribbean coast.

Leading Colombian exporter was Shell from the Yondo concession. A total of 9,271,255 bbl., valued at $18,126,884, or an average U. S. price, f.o.b. of $1.96, were shipped from this area. Second was Colombian Petroleum Co., which exported 9,041,994 bbl. valued at $23,836,377, or an average of $2.64, U. S. price, f.o.b., from the Barco.

The leading crude producer, Tropical Oil Co., exported 8,553,861 bbl. from De Mares. This crude was valued at $19,006,014, or an average U. S. price, f.o.b., of $2.22. Tropical refines a large part of its production in the Barrancabermeja refinery.



Construction Progressing at Grangemouth Refinery

These photographs show progress on the modernization of one of the world's oldest oil refineries—that of Anglo-Iranian Oil Co., Ltd., at Grangemouth, Scotland. The crude-distillation unit (left) and the phosphoric-acid treating plant (right) are scheduled to go on stream in the near future. The 10,000-bbl. daily fluid catalytic cracking unit and concomitant gas-recovery system is under construction and due for completion late this year. Refining of shale oil was first started on the site of the present Grangemouth plant more than 100 years ago. The current improvement program, contracted to Kellogg International Corp., will provide modern facilities with a capacity of about 30,000 bbl. daily. Work is also under way on the construction of a 60-mile 12-in. crude pipe line extending across Scotland. Crude for Grangemouth will be supplied through the line.

Colpet operates a small plant in the Barco which is now being improved.

Shell also shipped 975,580 bbl., valued at $2,754,126, or an average U. S. price, f.o.b., of $2.82 from the Dificil concession. Socony-Vacuum exported 426,182 bbl., valued at $745,818, or an average U. S. price, f.o.b., of $1.75, from Cantagallo.

Distillation Plant Finished

Petroleos Mexicanos is reported to have completed construction of a 5,000-bbl. distillation plant near the border city of Reynosa in the State of Tamaulipas.

The refinery was constructed by Mexican engineers in less than 6 months at a cost of about $1,000,000. It will be supplied with crude from the Francisco Cano and Monterrey fields of northern Mexico.

The plant is located on the Reynosa - Matamoros highway. Some of the equipment used consisted of facilities from a refinery near Tampico which were dismantled and moved to the Reynosa site. Additional equipment was purchased in the United States.

I.S.A.P. to Meet in March

The first inter-American conference of I.S.A.P. (South American Petroleum Institute) will be held in Montevideo March 12-16, 1951.

Printed copies of the program and agenda for the meeting have been mailed to the entire membership and to invited guests from outside South America. All papers with political implications, or which may give rise to political discussions, will be prohibited under rules and regulations adopted specially for the convention.

Purpose of the conference will be to study ways and means to intensify crude production and manufacture of petroleum products on the continent; recommend measures which will avoid waste in production of crude and manufacture of products; consider practical methods to increase distribution of petroleum among South American nations; and promote interchange of ideas and friendly relations among South American oil operators.

German E. Villar, executive secretary of the arrangements committee, is handling reservations. He maintains offices at Avenida Agraciada 1464, piso 9, Montevideo.

Peruvian Congress Meets

The Peruvian Congress is now meeting in a special session called to take action primarily on the proposed new petroleum law.

There is some doubt that the law will be approved in its original form which was in general acceptable to the several interested foreign oil companies. While no final action has been taken, a number of amendments proposed would eliminate some of the more favorable aspects of the law.

The session, which convened January 8, will continue until February 13. The law, which has administration backing, was drawn up more than a year ago by a government commission which recognized the need for providing a suitable legal base for renewed exploratory activities in the country. One objection has been against the third export duty on oil, but an amendment in Congress proposes to retain this levy.

Several companies have taken out preliminary exploratory permits and have done geological and geophysical work in the Sechura coastal region on the prospect that the law would be approved. These companies are Conorado Petroleum Corp., Richmond Petroleum Co., and International Petroleum Co., Ltd.

Drilling Contract Signed

Petroleos Mexicanos has signed a straight drilling contract with Pike Drilling Co., Los Angeles, for work in Baja (Lower) California.

In Mexico City it was reported that the drilling by Pike in Baja California would be the first in that part of Mexico. Sen. Antonio Bermudez, Pemex director-general, did not disclose details of the contract but indicated the company would be paid a straight drilling fee rather than on a percentage-of-production basis.

The Baja California area has long been of interest to geologists. In contrast to the unpromising west coast of Mexico itself, there is a half-graben type of sedimentary basin along the central west part of the peninsula. Pemex geologists have studied the San Ignacio district, and believe conditions are favorable for the exploratory effort. Testing of this area was called for under Pemex's new program.

Recent reports on current drilling in Mexico show that operations by Mexican American Independent Oil Co. (CIMA) on Tortuguero 9 continue at a standstill because of stuck drill pipe. Tortuguero 10 is expected to be spudded in in the near future. Pemex is reported to have completed a new well with a production of 400 bbl. daily in Limon field in the state of San Luis Potosi.

European Oil Equipment

American firms say they can buy any item desired if they pay more, are willing to wait, or take substitutes

Dahl M. Duff

EFFORTS of five or six American oil companies to shift a substantial part of their buying over to non-dollar European sources have met with widely differing results, but in general they report that almost any item of oil-industry material can be purchased abroad.

This, however, is possible only if a company:

1. Is willing to wait long enough on delivery.

2. Has a lenient and adaptable field engineering staff.

3. Is prepared to pay prices in some cases up to 10 to 15 per cent above those in the United States.

4. Has an established purchasing staff located abroad which is experienced in dealing in foreign markets.

These and other facts about purchasing in Europe have been impressed on the various officials in charge of the actual buying programs. They represent the American companies with operations abroad which were hit by the dollar shortage a year or so ago. For most of them, it was a matter of redoubling European buying efforts in order to utilize substantial amounts of soft currencies received from their oil sales.

Difficulties.—Most of the difficulties of buying oil-industry equipment in Europe arise out of the fact that its production capacity is strictly limited. This is obvious from the fact that the European companies themselves continue to obtain a sizable part of their own requirements from the United States.

Even the American companies under the heaviest pressure to cut dollar outlays to the absolute minimum have found it desirable to continue to draw on the United States for much important material. A particular item might be available in Europe, but the American buyer often finds it necessary to wait a year or more for the European manufacturer to get down to his order or to handle a nonstandard job.

Pipe situation.—Pipe, under present conditions, falls into a separate class. The scramble for this No. 1 oil-industry need is world wide, and the question of using soft currency as against dollars becomes somewhat academic when it comes to buying casing and line pipe.

In Europe, pipe is reported to be completely off the market until well into 1952. Some German-made pipe is being brought into the United States, but the quantity is said to be extremely small. One large American company, not engaged in foreign operations or involved in the dollar problem, recently scouted the European pipe market because of the lengthening delivery time in the United States.

An American purchasing agent who has been buying in Europe for several years with soft currency, complained that, for pipe, it had become necessary to compete against dollar buyers from domestic United States companies. The pipe shortage existing in the United States as well as in Europe also extends to basic steel products such as structurals and plate.

May get worse.—Another official representing a large American company operating both in the United States and abroad, said the pipe situation will probably get worse during the next 2 or 3 months. By that time, Washington should have set up a program of fair allocation of essential tubular goods for the industry, both foreign and domestic. In his opinion, military orders in the United States are the direct cause of the tight pipe supply. Artillery, mortar, and rocket shells, and also bombs take pipe steel by the tens of thousands of feet, and these are beginning to be produced again in quantity.

One result of the tight pipe supply is the reappearance of gray-market offers to the oil companies. "As for European pipe," the purchasing agent of a large company said, "hardly a day passes that some stranger doesn't approach this office claiming a connection with some mill in Europe and an option on a certain amount of pipe.

"Most of them don't even know how to spell the name of the mill they say they represent. What they want is an order of any kind on paper. Some of them even offer to put up performance bonds. The prices, of course, are 50 to 100 per cent over the going market. We don't even discuss it with them."

Companies wary.—While the American companies are anxious to get casing and line pipe from European sources, most of them are somewhat wary over using foreign-made drill pipe. They feel the risk of a bad string is not worth taking. However, in the case of one important American producer abroad, the purchasing department only recently was authorized by the company to obtain drill pipe from Europe.

As for pipe and other materials generally, buying in Europe requires an aggressive purchasing staff on the ground. Particularly in times like the present, suppliers frequently must be sought out and negotiated with for filling an order.

Procedures differ.—With little of the American-type competition, European procedures differ greatly. Suppliers sometimes expect and are given an opportunity to meet or better the closed bid made by another manufacturer. What Americans know as cartels exist to a greater or less degree in connection with shipments for export. However, it was pointed out that a buyer is permitted to refuse the allocation of his order to a certain manufacturer if an unsatisfactory delivery has been made by this manufacturer previously. Contacts are especially important in buying in Europe, and an earlier buying record is important with the more reputable suppliers.

U.K. leads.—The United Kingdom continues as the leading source of oil-industry equipment in Europe. However, its capacity goes mainly to the British companies. According to one purchasing official, the priority for orders from the United Kingdom are first to British companies headquartered in London, second to British companies with headquarters elsewhere, and thirdly to other buyers, including the American companies. The United Kingdom has made tremendous increases in its capacity to produce oil-industry material since the end of the war, and further gains, unless they are blocked by demands of the defense program, will undoubtedly eventually help meet the problem of the American companies operating abroad.

Although certain items are produced in Italy, France, and the Netherlands, the next best source for materials in Europe besides Britain is Germany. An increasing variety of items are being manufactured in that country, and many of them to American standards.

The purchasing officials agree that it would be possible, though not practical, to initiate and sustain an oilfield operation completely from non-dollar sources. With highly manufactured equipment, the ready delivery of familiar American-made items is still preferred. European material, particularly expendable supplies, is being worked into the operations gradually and according to its availability.

Presents a problem.—While much European oil-industry material is being made to American standards, it still presents a problem to American engineers working overseas and using

such equipment for the first time. Another consideration is the fact that the national staffs in the producing countries have often been trained on American-made material. "A native worker has been trained to disassemble and repair a certain American engine," said one official. "Give him one, say for example, from Italy, and he's apt to throw up his hands." One common complaint regarding material from continental Europe is that too much of it is cumbersome, heavy, and difficult to repair. As far as is known, no European rigs are being used by American companies in their foreign operations.

Price comparison.—There is also a wide difference in reports on how European equipment compares price-wise with that from the United States. Generally, it appears that items from Germany and other continental countries have been rising for the last 6 months and are now from 8 to 10 per cent or more higher than in the United States. As far as Britain is concerned, it was said that British pipe can compete with United States product on a laid-down basis in western Canada, and that the differential will be even greater with further increases in the American price.

In the refining field, a study by one company recently showed it would be possible to obtain in Europe more than 90 per cent, on a cost basis, of the equipment required for a medium-capacity refinery. The material that cannot be obtained in Europe at present, according to this report, includes high-temperature insulation, certain lined vessels, and some types of instruments.

New Reforming Unit

Compania Espanola de Petroleos, Madrid, has a project under way which will include a 6,000-bbl. daily reforming unit for its Santa Cruz de Tenerife refinery.

This addition will raise total cracking and related capacity to 11,000 bbl. daily. A thermal cracking unit, with a capacity of 5,000 bbl. daily, is now in operation at the plant. Facilities are being readied also for propane-butane extraction. This equipment is expected to be in operation by early 1951.

Jutland Test at 11,300 Ft.

Continuing its exploratory program in Denmark, Danish American Prospecting Co. is now drilling below 11,300 ft. in its 1 Gassum well in central Jutland.

The well will be taken to 12,000 ft. or more in the hope of determining the possibilities of production from the Zechstein before the limit of the equipment is reached. Next location for the rig will be near Tonder in south Jutland. The Gassum well now ranks as one of the deepest drilled in northern Europe.

The lighter rig being used by Danish American Prospecting is being moved to a location on Funen Island. The Haldager well drilled by this rig in the Aalborg area was abandoned at about 5,000 ft. An earlier test, 1 Frederikshavn in northern Jutland, was dry at 4,319 ft. in basement rock.

Austrian Production

Reports indicate output is higher than credited

A CONSIDERABLY higher crude production than heretofore credited to the predominantly Russian-controlled oil industry in Austria is now given in reports emanating from Vienna.

Last year it is estimated that 1,500,000 tons or about 28,000 bbl. daily was produced in Austria. These same sources believe current production is at the rate of nearly 1,750,000 tons or more than 32,000 bbl. daily.

The Austrian oil industry is more than 90 per cent controlled by the Soviet Mineral Oil Administration, and no official production figures are available. The Russians took over the fields when they occupied Austria, and the refusal of the Russians to give up the fields, which they claim as German assets, has been one of the principal points blocking a treaty which would end the occupation.

Field output.—The Zisterdorf wells are reported to be now yielding about 100,000 tons a month, or 22,400 bbl. daily. The field at Matzen which the Soviet organization opened up in 1949 produces another 20,000 to 30,000 tons, while Aderklaa, where oil was found last year, provides an estimated 20,000 tons a month. The Russians are reported to be now carrying out exploratory work in the region of Bockfliess and have set up a total of 4,000,000 Austrian schillings for exploratory work in 1951.

The reported 1,500,000-ton Austrian production last year is the highest output on record in the country. About 1,250,000 tons, or 23,400 bbl. daily, were produced in 1949, 960,000 tons or 18,000 bbl. daily in 1948, and 1,210,000 tons, or 22,600 bbl. daily in 1944 when the fields were under German control.

Refineries.—Seven refineries, five of them controlled by the Russians, are operating in Austria, but the low gasoline yield of these plants results in an unsatisfactory products output. The refineries have a total capacity of about 22,000 bbl. daily, but only two of them have cracking facilities. About half the total production is in the heating-oil range of fractions.

Allocations of products made by the Soviet Mineral Oil Administration to Austria were raised at the beginning of this year, and roughly half the total production is being returned to the Austrian economy. The rest is exported by the Russians. Austria now receives monthly 9,000 tons of gasoline, or about 2,500 bbl. daily, 36,000 tons of heating oil, or about 8,700 bbl. daily, and 4,000 tons of naphtha, or about 1,100 bbl. daily.

Unofficial orders.—Other quantities, particularly heating oil, are sometimes offered unofficially. It is said that the Russians have no objection to exports by Austria of heating-oil surpluses to such countries as Switzerland and West Germany, but the Austrians are not inclined to execute such contracts since the Russians insist on 100 per cent of the foreign-exchange proceeds. Austria could probably become independent of gasoline and motor-oil imports if the refinery yields could be improved.

The Austrian production not controlled by the Russians is operated by the Van Sickle interests and by the joint subsidiary of Socony-Vacuum Oil Co., Inc., and Shell. The latter company, Rohoel-Gewinnungs, A.G., has been carrying out an exploratory program for several years in upper Austria, and a recent report said some 60 core holes had been drilled since 1948 in the area between Salzach and Matig and that seismograph equipment was also being employed.

AFRICA

More Fertilizer Output

Plans are being made by Egyptian Fertilizer & Chemical Industries Co. to draw on Ras Gharib field for additional supplies of natural gas for the manufacture of fertilizer.

Gas taken from the field will be used to supplement that now obtained from the refinery at Suez. Plans call for the construction of a gas pipe line from Ras Gharib to Suez. As a result of the additional gas supply, the company expects to increase substantially its fertilizer production.

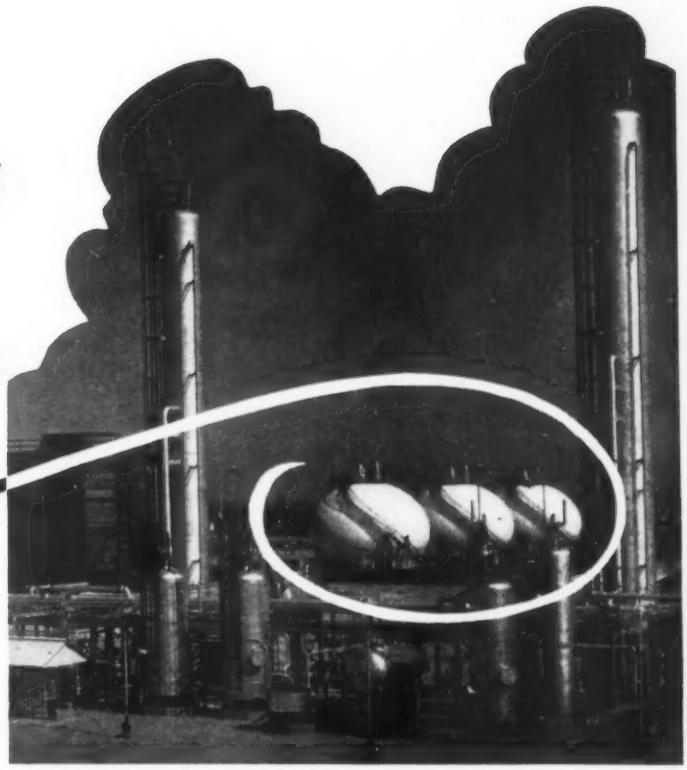
FAR EAST

North Borneo Production

Production of crude oil in British North Borneo has now reached a record rate of 100,000 bbl. daily, or approximately 5,000,000 tons a year.

The Shell organization which operates in the area rehabilitated the installations following their recapture from the Japanese in 1945 and have now built up output to approximately five times what it was prewar.

The *Where and Why* of storing Natural Gasoline



Here's how a modern natural gasoline plant stores its output of this highly volatile liquid.

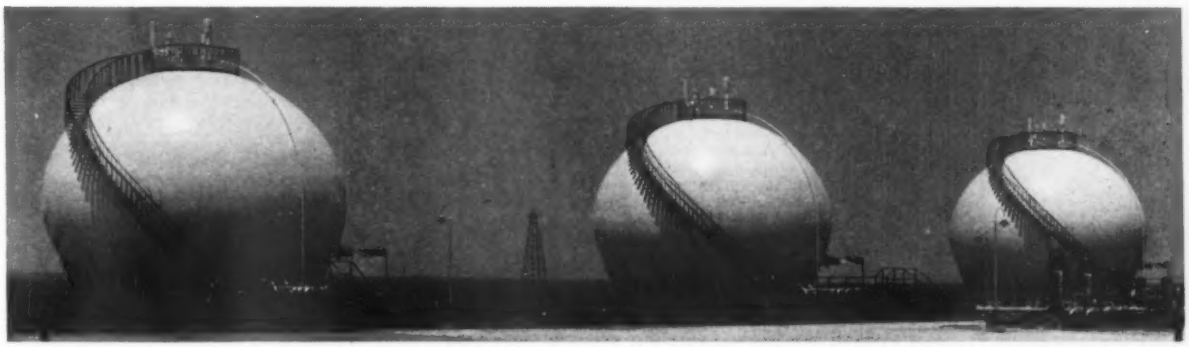
The North Cowden plant near Odessa, Texas, is operated by the Stanolind Oil and Gas Co. for a group of 21 owners. It provides facilities for one of the world's largest gas injection programs. The plant can currently process 50,000 Mcf daily but this can be doubled by adding certain items of equipment. The daily production total of 150,000 gallons of liquid products includes butane, propane and natural gasoline.

Natural gasoline cannot be stored at atmospheric pressure without excessive loss. *Where,* (in what type tank) is it held at the North Cowden plant? It is stored *under pressure* in the three 5,000-bbl. Hortonspheroids shown in the two views on this page.

Why is a Hortonspheroid so suitable for handling natural gasoline? First, it does not vent under normal operating conditions because it can withstand the internal pressure caused by daily temperature changes.

The Hortonspheroid is safer too. By decreasing venting, it prevents the accumulation of explosive or toxic vapors in the storage area.

Hortonspheroids are available in standard capacities from 2,000 to 120,000 bbls. Write our nearest office for Bulletin E for details on dimensions and recommended operating pressures.



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Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615—1700 Walnut Street Bldg.
Salt Lake City, 4.....525 West 17th South St.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.

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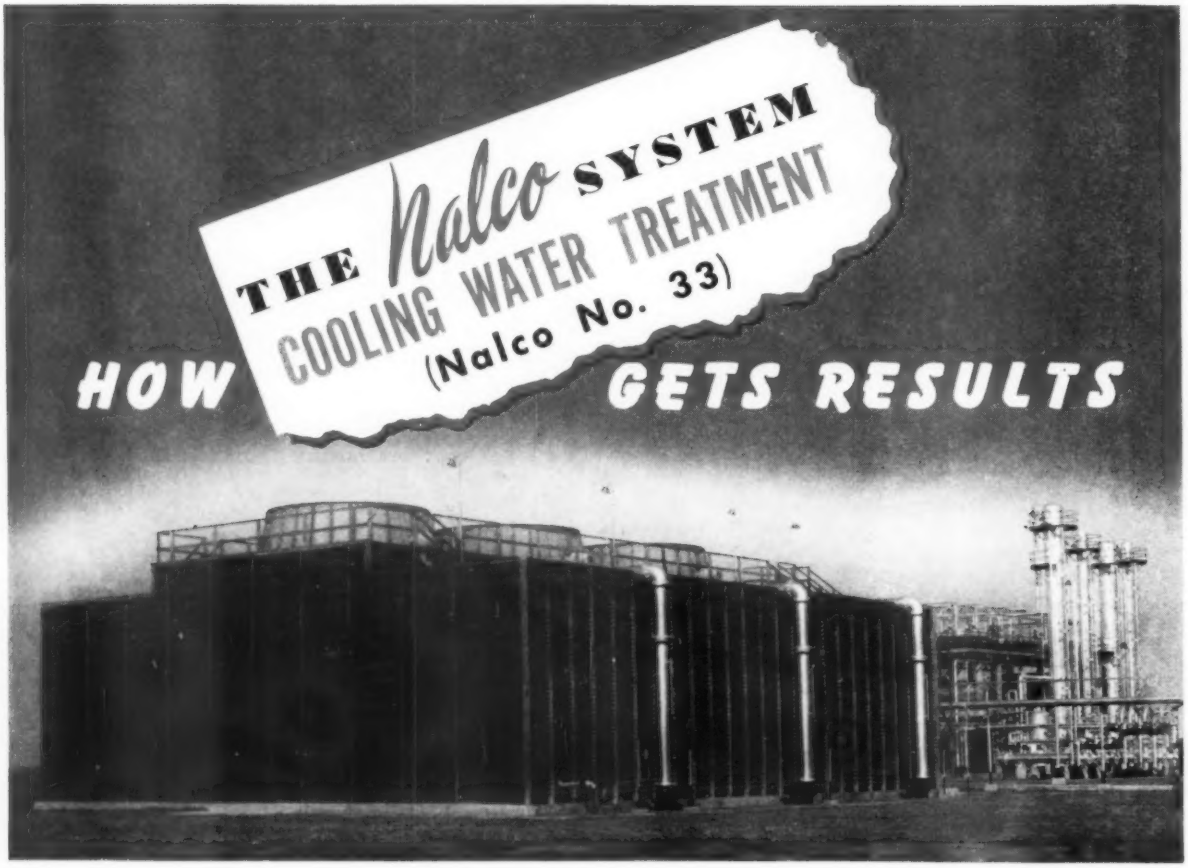

BELOW are the basic characteristics of the Nalco No. 33 method, one of several Nalco approaches to problems of cooling water treatment. At right are typical results —such as YOU may expect with the Nalco System.

- Provides *complete* recirculating system protection against scaling and corrosion.
- Maintenance of pH between 6.0 and 6.5 prevents scaling, stops delignification of cooling tower lumber, and cuts chemical requirements for slime and algae control as much as 50%.
- Use of Nalco No. 33 builds microscopic, impervious protective film on pipelines and equipment to positively prevent corrosion.
- Non-toxic Nalco No. 33 makes use safe; eliminates contamination problems.
- Silica concentrations in recirculating water may be allowed to run much higher without danger of SiO_2 depositions.

Write for complete details on Nalco System cooling water treatment fitted to your requirements.

Type of Plant	Recirculation Rate (gpm)	Hardness of System Water (ppm)	Results (as reported from the field)
Refinery	105,000	550	Gradual improvement during the 22 months of operation with No. 33 has been experienced in cleanliness of the system and absence of corrosion. Slime control has been easier.
Compressor Station	4,800	1,200	This job was almost impossible to treat. Results are excellent.
Chemical Plant	2,100	1,000	Condensers have been in service two years without cleaning. No scale or plugging of tubes due to bacteria or slime was found within that time.
Steel Mill	1,200	40	Results are excellent. High skin temperatures in furnace are experienced but no corrosion or scale has been found in these hot sections since using No. 33.
Distillery	4,300	200	Very good. They experienced considerable slime before starting treatment. The lower pH permitted slime control with economical dosages.
Gasoline Plant	2,000	3,400	Coils at the base of the tower stay clean in spite of the tremendously high hardness.

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THE *Nalco* SYSTEM • **Serving the Petroleum Industry through Practical Applied Science**

PERSONALS

Steps Up

Wells named manager of Sun Oil refineries

LOUIS B. WELLS, manager of Sun Oil Co.'s Marcus Hook, Pa., refinery, has been appointed to the newly created position of manager of Sun Oil Co. refineries.

Born on July 18, 1903, Wells spent his childhood at Bryn Mawr, Pa. He attended Haverford School, Haverford, Pa., and Phillips Andover Academy, Andover, Mass. He started work at the Marcus Hook refinery in 1923, after having been employed by Sun Shipbuilding & Dry Dock Co. for 6 months.

Assigned to the experimental laboratory, he gained early experience with the mercury vapor process for the manufacture of motor oil in the days of its development. After a period of service as yield clerk, he became foreman of the plants utilizing the mercury process. Subsequently additional plants were placed under his supervision.

He was named assistant superintendent in October 1933, became refinery superintendent in January 1944, and was appointed refinery manager in May 1949.

The new position was created to bring about greater coordination in the operation of Sun's Marcus Hook and Toledo refineries in view of increasing demands being made on them both for civilian and military petroleum products.

He will continue to make his headquarters at Marcus Hook.

Charles E. Maschal, assistant manager of Sun Oil Co.'s Marcus Hook, Pa., refinery, has been appointed manager of the refinery, succeeding **Louis B. Wells.** He graduated from Drexel Institute of Technology with a B.S. degree in civil engineering in 1931, and joined Sun as a still fireman at Marcus Hook refinery in 1933. He served as technical engineer from 1934 until 1939 when he was named an operating assistant. He became an assistant superintendent in 1944, administrative assistant superintendent in 1947, and assistant manager in 1949.

C. E. MASCHAL

Lawrence Muir, head of the geological and scouting department for Champlin Refining Co., has been named executive vice president in charge of production, succeeding **Doyle W. Cotton,** who has resigned to become an independent oil operator.

Floyd E. Kisler will be in charge of the new district office opened at Vandalia, Ill., for Independent Exploration Co.

F. C. Lantz, Toronto, formerly assistant general manager of manufacturing for Imperial Oil Co., has been named assistant to the vice president of supply and transportation. He is succeeded by **J. D. Bradley,** who was formerly manager of the operating division of the manufacturing department.

Joseph E. Carney, chief inspector of Sun Oil Co.'s metallurgical department at the Marcus Hook, Pa., refinery, has been appointed assistant chief metallurgical engineer of the firm. He has been with the company since 1934.

W. B. Emery, II, district engineer for Ohio Oil Co., has been transferred from Casper, Wyo., to Sidney, Neb.

R. G. Russell, Gulf Research & Development Co.; **J. R. White,** Socony-Vacuum Laboratories; and **J. Norton Wilson,** Shell Development Co., have been named to membership of the newly formed American Society for Testing Materials committee on radioactive isotopes.

Alexander Johnston, vice president in charge of the crude-oil marketing division for Sinclair Oil & Gas Co., and **L. G. Rheinberger,** vice president in charge of operations of the gasoline department, have been elected members of the board of directors.

Lt. Gen. Ernest O. Thompson, member of the Texas Railroad Commission, was honored at a reception and dinner on February 6 at Hotel Texas in Fort Worth. Oil men from over the entire Southwest attended.

Dannie W. Smith, assistant district superintendent for Sohio Petroleum Co. at Russell, Kans., has been transferred to Shreveport, La., as district superintendent.

J, Curtis McCarthy, petroleum-engineering supervisor for Stanolind Oil & Gas Co. at Tulsa, has been transferred to Midland, Tex., as district engineer of the West Texas district.

Clifford M. Ford, tool pusher for Standard Fryer Drilling Co., has been transferred from Rankin to Ozona, Tex.

Frederick L. Convers, formerly with Stanolind Oil & Gas Co. at Midland, Tex., has entered University of Pittsburgh as a graduate student in petroleum engineering.

Frank Lindeman, Jr., formerly operating superintendent, has been named general superintendent of the producing department for Stanolind Oil & Gas Co., at Tulsa. **H. T. Hunter,** assistant division production superintendent, becomes operating superintendent in charge of production and drilling. Lindeman joined Stanolind in 1933, and was in charge of the firm's marine operations in the Gulf of Mexico prior to becoming operating superintendent in 1949. Hunter joined the firm in 1934, and was named assistant division production superintendent in 1948.

Coleman D. Hunter, who joined Kentucky West Virginia Gas Co. in 1928, has been appointed chief geologist of the company. He will have

C. D. HUNTER

G. W. HEREFORD

offices at Ashland, Ky., and will report to the vice president and general manager. He is a graduate of University of Kentucky. Other new appointments in the firm include: **George W. Hereford,** supervisor of gas measurement, to be gas engineer acting in an advisory engineering ca-

PERSONALS

pacity to the operating personnel; **William O. Smith,** to be assistant to the chief geologist; and **P. D. Wells,** to succeed Hereford as supervisor of gas measurement.

L. S. Wescoat, Pure Oil Co., Chicago, has been appointed chairman of the program and budget review committee of the American Petroleum Institute for 1951. Chairmen of the various committees are as follows: **A. Jacobsen,** Amerada Petroleum Corp., national oil policy; **Dr. Robert E. Wilson,** Standard Oil Co. (Ind.), research; **John M. Lovejoy,** Seaboard Oil Co. of Delaware, public relations; **John R. Suman,** Standard Oil Co. (N. J.), safety; **Robert H. Colley,** Atlantic Refining Co., nomination; **Sidney A. Swensrud,** Gulf Oil Corp., agricultural advisory; and **L. S. Wescoat,** automotive safety foundation conference.

Clarence P. Boutte, senior engineer for Shell Oil Co. at the Houston plant, has been named acting assistant chief engineer, replacing **Joseph Levada,** who was transferred to the Torrance, Calif., plant.

Don Bills has been appointed acting district geologist in the Illinois basin area for Cities Service Oil Co. (Del.), replacing **Ralph Hamblin** who has resigned.

Trygve M. Byre, assistant chief chemist in charge of the experimental section of the laboratory for Shell Chemical Co. at the Martinez, Calif., plant, has been transferred to the Houston plant in a similar position.

Myrl Rumsey, superintendent at Wichita for Rumsey Brothers Pipeline Construction Co., has been transferred to Houston.

Harry T. Bryant, tool pusher in the production department of Commercial Petroleum & Transport Co., at Cleveland, Tex., has been transferred to Houston as drilling superintendent and purchasing agent.

H. M. Horton, formerly vice president of Superior Oil Co. of Venezuela and Colombia, and more recently operating and producing independently in the Illinois basin with offices at Mount Carmel, Ill., has moved his headquarters to Santa Rosa, Calif.

M. S. Patton, Jr., division engineer for Sunray Oil Corp. at Midland, Tex., has been transferred to Tulsa as staff exploitation engineer.

Marsh S. Watson, Jr., petroleum engineer for D. D. Feldman Oil & Gas Co. at Colorado City, Tex., has been transferred to Monahans, Tex.

Louis T. Moffatt, engineer for Sunray Oil Corp. at Madison, Kans., has been transferred to Tulsa.

K. R. French, independent petroleum engineer and wildcat operator at Worcester, Mass., has moved his headquarters to Portales, N. M.

D. K. Hanan, supervisor of exploration for Hanan & Morrow at Roswell, N. M., has been transferred to San Diego, Calif., where he will engage in geophysical research in southern California.

Herbert Frederic Miller, manager of the crude-oil sales purchase department of Carter Oil Co., and vice president and director, has retired after 48 years' service with Standard Oil Co. (N. J.) and its affiliates.

D. W. CAMERON

D. W. Cameron has been appointed manager of Carter Oil Co.'s crude-oil purchasing department, succeeding **H. F. Miller,** who has retired. Cameron joined Carter in 1935 as a hall boy after graduating from University of California. He was named chief scout in 1946. Subsequent to this appointment, he became assistant to the president, and in 1949 became assistant to Miller. **C. M. York,** formerly chief clerk of the department, will be assistant to Cameron.

Oakah L. Jones, assistant secretary-treasurer of Oklahoma Natural Gas Co., has been named Tulsa district manager. He will be succeeded by **R. R. Allen.**

R. F. Hodder, district geologist for Stanolind Oil & Gas Co. at San Antonio, has been transferred to Houston. **R. E. Ming,** formerly of Houston, has been transferred to San Antonio to succeed Hodder.

B. F. Owings, Jr., formerly party chief for National Geophysical Co. at Rio Grande, Tex., has joined Honolulu Oil Corp. at Midland, Tex., as geophysicist.

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pacity to the operating personnel; **William O. Smith,** to be assistant to the chief geologist; and **P. D. Wells,** to succeed Hereford as supervisor of gas measurement.

L. S. Wescoat, Pure Oil Co., Chicago, has been appointed chairman of the program and budget review committee of the American Petroleum Institute for 1951. Chairmen of the various committees are as follows: **A. Jacobsen,** Amerada Petroleum Corp., national oil policy; **Dr. Robert E. Wilson,** Standard Oil Co. (Ind.), research; **John M. Lovejoy,** Seaboard Oil Co. of Delaware, public relations; **John R. Suman,** Standard Oil Co. (N. J.), safety; **Robert H. Colley,** Atlantic Refining Co., nomination; **Sidney A. Swensrud,** Gulf Oil Corp., agricultural advisory; and **L. S. Wescoat,** automotive safety foundation conference.

Clarence P. Boutte, senior engineer for Shell Oil Co. at the Houston plant, has been named acting assistant chief engineer, replacing **Joseph Levada,** who was transferred to the Torrance, Calif., plant.

Don Bills has been appointed acting district geologist in the Illinois basin area for Cities Service Oil Co. (Del.), replacing **Ralph Hamblin** who has resigned.

Trygve M. Byre, assistant chief chemist in charge of the experimental section of the laboratory for Shell Chemical Co. at the Martinez, Calif., plant, has been transferred to the Houston plant in a similar position.

Myrl Rumsey, superintendent at Wichita for Rumsey Brothers Pipeline Construction Co., has been transferred to Houston.

Harry T. Bryant, tool pusher in the production department of Commercial Petroleum & Transport Co., at Cleveland, Tex., has been transferred to Houston as drilling superintendent and purchasing agent.

H. M. Horton, formerly vice president of Superior Oil Co. of Venezuela and Colombia, and more recently operating and producing independently in the Illinois basin with offices at Mount Carmel, Ill., has moved his headquarters to Santa Rosa, Calif.

M. S. Patton, Jr., division engineer for Sunray Oil Corp. at Midland, Tex., has been transferred to Tulsa as staff exploitation engineer.

Marsh S. Watson, Jr., petroleum engineer for D. D. Feldman Oil & Gas Co. at Colorado City, Tex., has been transferred to Monahans, Tex.

Louis T. Moffatt, engineer for Sunray Oil Corp. at Madison, Kans., has been transferred to Tulsa.

K. R. French, independent petroleum engineer and wildcat operator at Worcester, Mass., has moved his headquarters to Portales, N. M.

D. K. Hanan, supervisor of exploration for Hanan & Morrow at Roswell, N. M., has been transferred to San Diego, Calif., where he will engage in geophysical research in southern California.

Herbert Frederic Miller, manager of the crude-oil sales purchase department of Carter Oil Co., and vice president and director, has retired after 48 years' service with Standard Oil Co. (N. J.) and its affiliates.

D. W. CAMERON

D. W. Cameron has been appointed manager of Carter Oil Co.'s crude-oil purchasing department, succeeding **H. F. Miller,** who has retired. Cameron joined Carter in 1935 as a hall boy after graduating from University of California. He was named chief scout in 1946. Subsequent to this appointment, he became assistant to the president, and in 1949 became assistant to Miller. **C. M. York,** formerly chief clerk of the department, will be assistant to Cameron.

Oakah L. Jones, assistant secretary-treasurer of Oklahoma Natural Gas Co., has been named Tulsa district manager. He will be succeeded by **R. R. Allen.**

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XUM

Comparative Operating Data of Tractors Using Gasoline or L.P.G. Fuel

by Marvin J. Samuelson*

This article and the two which follow comprise a symposium of portions of three papers on "Liquefied Petroleum Gas as Tractor and Automotive Fuel," presented at the annual meeting of the Society of Automotive Engineers at Detroit, January 8-12.

TODAY a comparatively new fuel for tractor engines has been introduced, and it promises to replace great quantities of gasoline in many areas. This fuel is liquefied petroleum gas (L.P. gas). Surveys indicate large potential supplies are available which have been made possible by the rapid increase in natural-gas production, new refining methods, and the conservation of natural resources.

In order that a comparison can be made between L.P. gas and gasoline it is desirable to review the properties of the two fuels. Below is a table listing the principal properties of the two fuels as they may affect engine performance.

COMPARISON OF PROPERTIES—L.P. GAS AND GASOLINE

Property—	Propane	Isobutane	n-Butane	Gasoline
B.t.u./lb. of liquid	21,600	21,300	21,300	20,750
Vapor pressure psig. at 60° F.	92	24	12	8-11*
Boiling point at atmospheric pressure, °F.	—44	10	32	90
Wt. per gal. liquid 60° F. and vapor press. at 60° F.	4.24	4.70	4.86	6.00
B.t.u. per gallon liquid	91,500	100,000	103,000	125,000
Octane rating (research)	111.8	94	94	79-90+

*R.v.p. at 100° F.

It will be noted that the B.t.u. content per pound of liquid fuel, whether it is L.P. gas or gasoline, is approximately the same. The weight per gallon of L.P. gas, however, is considerably less. There are approximately 30 per cent fewer pounds of fuel per gallon of propane and a correspondingly smaller per cent for the blends and butane as compared to gasoline. Consequently, L.P. gas must always sell for less per gallon in order to obtain the same heating value per dollar.

The octane numbers of propane and butane are considerably higher than that for most gasolines. They are higher than the present-day premium fuels and are somewhat higher than the aviation fuels now available. The high octane rating of the fuel permits engines to be designed with higher compression ratios giving increased power per cubic inch displacement and substantial improvement in the load fuel economy.

Part-load fuel-economy bar graph, Fig. 1, presents an average of a large number of tests conducted by the Minneapolis-Moline organization during the past 10 years. A comparison is made with 70 and 91-octane gasolines with the compression ratios for these fuels against L.P. gas at compression ratios varying from 5.4:1 to 9.0:1. Fig. 1 illustrates the two fuels and various compression ratios for five loads that are normally taken to obtain the part load curve on a given engine. These loads are the same as are normally taken in the official Nebraska tractor test. The operating maximum is the setting of the carburetor for near maximum performance with good fuel economy. The rated load is 85 per cent of the observed horsepower reading corrected to sea-level conditions. The 75, 50, and 25 per cent loads are percentages of rated load, not of maximum.

The specific fuel consumption has been converted to gallons per horsepower per hour in order to have a more direct comparison between L.P. gas and gasoline. This is done to overcome the unfair comparison that would result if pounds per horsepower hour were compared, inasmuch as L.P. gas weighs less per gallon than gasoline.

The bars for L.P. gas have a shaded and an unshaded part for all compression ratios except 9:1. The unshaded bars represent the fuel consumption that would be expected when 100 per cent propane is used, and the shaded portion represents the fuel consumption of 100 per cent butane. The maximum compression ratio that can be used for butane is ap-

*Field research engineer, Minneapolis-Moline Co.

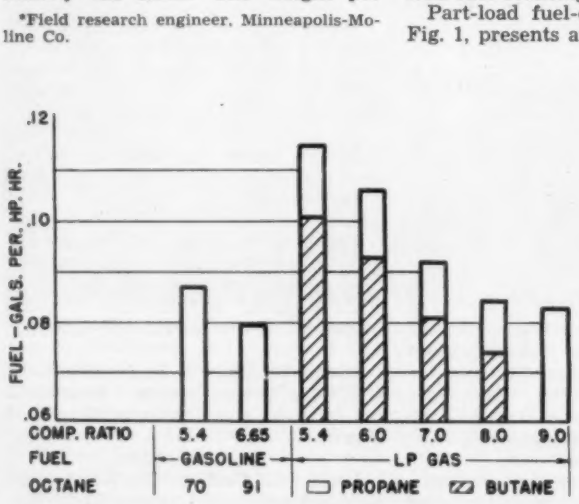

Fig. 1

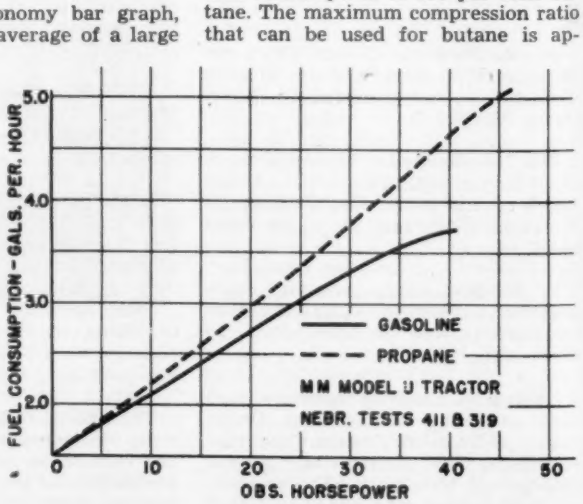

Fig. 2

proximately 8:1 and is the ratio where detonation begins to appear.

It will be noted that the fuel consumption is higher for L.P. gas than gasoline at all compression ratios at operating maximum load and to a lesser extent at rated load. However, when the comparison is made at the lighter loads, L.P. gas specific fuel consumption is considerably less than that of gasoline including 91-octane gasoline. This continues on into idle on a given engine. It will be noted that the butane consumption is considerably less than that of gasoline at all loads except operating maximum. Consequently, it is desirable from the point of operation to have as much butane in the L.P. gas as is possible to obtain wherever engines having compression ratios below 8:1 are used.

In all farming operations a certain amount of idling always takes place. Partial loads are the general rule, so any comparison of fuel consumption between L.P. gas and gasoline should take idling into consideration. Fig. 2 shows the fuel flow in gallons per hour of a Minneapolis-Moline Model U tractor as taken from Nebraska test Nos. 319 and 411. Test No. 411 was made with all power-consuming accessories included on the tractor, whereas Test 319 was tested without a number of these accessories. In making a fair comparison between the two tractors burning different fuels, a slight correction is made in the gasoline power output to compensate for these devices. It is of interest to note that fuel-consumption difference tends to become smaller at the lighter loads, and favors the L.P. gas slightly at the low end. The L.P. gas used in this test was propane.

Fuel economy is not all obtained in actual practice through efficient utilization in an agricultural tractor. There are shrinkages that take place to reduce the fuel economy. Losses that do not become apparent to many operators are the fuel-vapor escape through the gasoline tank vent, especially in hot-weather operation, and transfer spillage. Tests indicate that losses as high as 3 per cent can be obtained where surrounding air temperatures are high. Pilferage has been a problem with users where the employes have access to the fuel-storage tank. The special equipment necessary for L.P. gas has generally reduced this loss to zero. It is true that most operators fill L.P. gas tanks by bleeding vapor, and this would indicate a source of loss. Tests indicate that in the flow through a No. 54 orifice (0.0465 sq. in.), the maximum permitted under safety regulations, the loss is approximately 0.10 lb. per minute. Considering the time to fill an average tank, this loss would not be expected to exceed 1 per cent.

Engine and Carburetion-Equipment Requirements for L.P.G. Fuel

by A. J. St. George*

THE basic methods of handling L.P. gas in most of the fuel vaporizing and fuel metering systems in existence today are very similar in that most of them will take and handle the fuel from the L.P. gas fuel tank and pass it through the various stages indicated by the flow diagram, Fig. 1.

Liquefied petroleum gas is vaporized by heat from some source when used as an engine fuel. This means that a suitable vaporizer or heat exchanger is required to convert the liquid fuel into a gaseous fuel. Vaporizer equipment as recognized today utilizes heated water from the cooling system of the engine. However, the early work on vaporizers utilized heat from the engine exhaust gases but this method was not very satisfactory due to inability to control the heat available from this source and maintain it within a reasonable range.

Utilization of cooling water from the engine was the next step and the equipment for an L.P. gas-burning engine evolved into a liquid L.P. gas filter and a vaporized unit which included a first-stage regulator for reducing liquid fuel pressure to some lower pressure range at which it was to be vaporized. The vaporized fuel then was passed to another unit which was called the final regulator or second-stage regulator and from there to the carburetor which mixed the fuel with air and passed it on into the induction system of the engine. This arrangement, while it worked reasonably well, was cumbersome and expensive and on vehicle installations presented problems deriving primarily from lack of space under the hood. In the last few years the carburetion-equipment manufacturers have worked toward simplification of L.P. gas fuel systems.

Let us examine the carburetion equipment requirements for L.P. gas. The term carburetion equipment as used here includes the carburetor, vaporizer, economizer, filter, and other associated items (see Fig. 1). First of all, the carburetion equipment must provide a means of taking fuel from the supply tank, accomplish a change of state in the fuel for the easier handling, and control of its metering and properly mix and proportion the fuel for induction into the engine. This group of equipment should also provide starting, idling, acceleration, and flexibility of performance throughout the load and speed range of the engine on which it may be used. In other words, it is desirable to obtain performance characteristics similar to those obtained with a gasoline carburetor on gasoline fuel.

As indicated in Fig. 1, the high-pressure or first-stage regulator is ahead of the vaporizer. The function of this regulator is to reduce tank

*Ensign Carburetor Co.

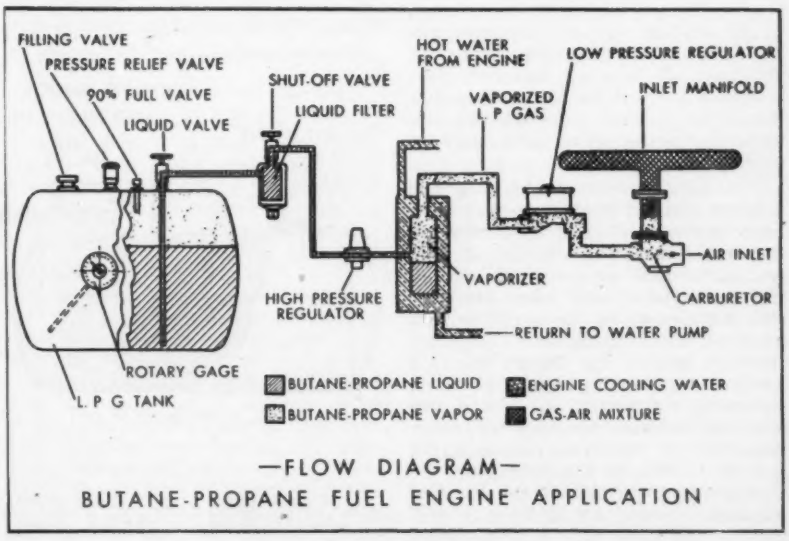

Fig. 1

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pressure to the range from 4 to as high as 15 psi., depending on the particular regulator. In actual practice, the first-stage regulator is built into the vaporizer, thereby providing compactness. The pressure reduction that takes place at the first-stage regulator involves an initial expansion of the fuel. Some of the liquid butane or propane is vaporized at the first stage of pressure reduction and it is this vaporized fuel which makes it possible to start the engine in warm or mild weather with liquid fuel being taken from the supply tank.

Initial Warmup

In cold weather, it is advisable to take vapor from the supply tank for starting and running during the initial warmup. The fuel from the first stage regulator is discharged into the vaporizing coil which is surrounded by water from the cooling system of the engine. Generally, the first-stage regulator valve is also water-jacketed to prevent freezeup. These two devices then accomplish the change in state of the fuel for easier handling and control of its metering.

From the vaporizer, the fuel passes into the second stage or metering regulator. This regulator is actuated by suction from the engine which occurs only when the engine is being turned over for starting or when the engine is already running. This suction from the engine opens the final fuel regulator sufficiently to allow fuel to pass to the carburetor and into the engine. The volume of fuel passed by the regulator will depend upon the throttle opening in the carburetor.

The carburetor is a device for mixing the butane or propane vapor with correct volumes of air. The types most generally used employ a removable venturi arrangement so that proper venturi size may be selected to fit certain engine requirements. Both the regulator and the carburetor are designed to work together. One is useless without the other. Together they must produce automatically and instantly the correct air-fuel ratios for every engine demand.

The requirements for mixing and proportioning of the fuel and air have been pretty well met generally by the different arrangements of L.P. gas carburetors now on the market. However, there have been considerable differences in the arrangements provided for starting and it appears that the picture has finally resolved into two distinct types, one of which embodies a manual or electrically operated primer, whereas the other embodies a separate fuel-metering system built into the carburetor so that positive control of the air-fuel mixture required for starting is provided. This latter type is so designed that a full closing of the choke is required in order to cut out the main fuel-metering system and cut in the special fuel-metering system for the starting of the engine.

The starting fuel system has its own fuel adjustment so that the fuel required to start and run the engine with the choke closed can be metered to provide the proper air-fuel-mixture ratio. The air going into the engine with the choke closed would naturally be that volume which passes through a hole in the choke disk provided for that purpose. After the initial adjustment of the starting system has been made, no further adjustments are necessary.

Idling of the engine is accomplished in two different ways, one of which is to bleed off a volume of fuel from the main fuel-metering system in the carburetor and by means of an adjustment to control the air-fuel-mixture ratio at a given throttle opening. The other arrangement requires an external idle fuel-line connection between the carburetor and the secondary regulator of the vaporizer assembly. In this case, the idle fuel derives from two sources, (1) through the main gas orifice in the carburetor, and (2) from an idle metering arrangement built into the secondary regulator. This source of the supplemental idle fuel is independent of the main gas supply to the carburetor and the two sources of idle fuel combine to make a very satisfactory idling system.

Since economy at part-throttle operating conditions is also very desirable, a means of providing control of part-throttle air-fuel-mixture ratios is provided by different types of economizer devices most of which are vacuum operated. Basically their design incorporates a means of reducing the main gas-orifice area a predetermined amount from that required for full-throttle operation. By using the correct rate of spring back of the economizer diaphragm, the cut-in point of the economizer can be shifted to that part of the range desired. These devices have proved satisfactory and are in wide use where variable-speed and variable-load conditions are encountered.

L.P. Gas for Motor Fuel

by R. C. Alden* and F. E. Selim*

THE idea of seeking a large-scale motor-fuel market for liquefied petroleum gas is almost as new and startling to the petroleum industry as it is to the automotive industry. When this subject has come up in the past—as it has quite frequently—there have always been more good arguments against than for it.

There was not enough of the stuff; its marketing would complicate the motor-fuel tax situation, without suitable utilization equipment the fuel would make a sorry showing in comparison with other motor fuels; the other large-scale uses for L.P. gas could use up the supply; its marketing would seriously disturb the gasoline market; the requirement of pressure handling was too big a handicap, etc.

Actually, of course, the basic and important question has been the one of availability, And, so far as we know, it has been only a very short

*Phillips Petroleum Co.

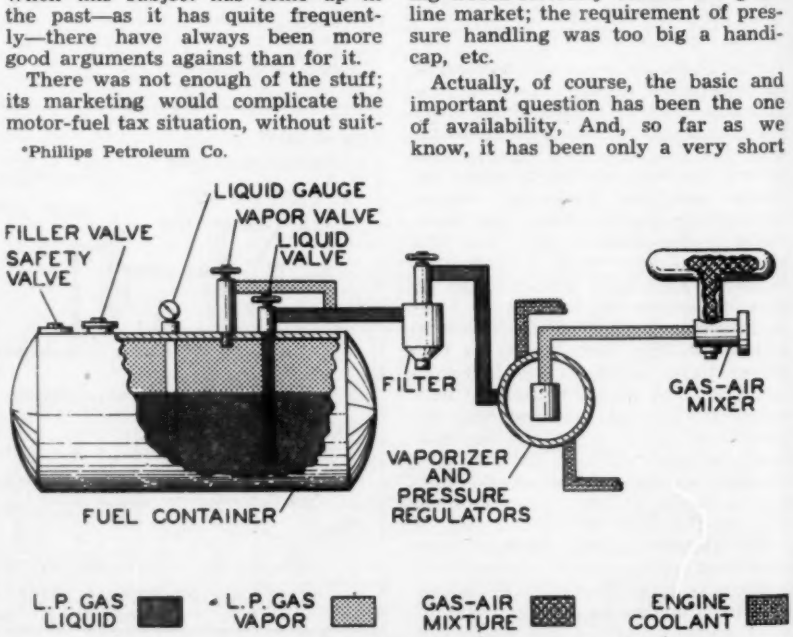

Fig. 1—Flow diagram for L.P.G. application.

time since any large oil company east of the Rockies has embraced the idea.

The question of L.P. gas as a direct motor fuel not only for tractors but for other of the highway uses and for trucks and buses in a very lively topic today in both the automotive and petroleum industries.

It is estimated the 1950 sales of conversion units for farm tractors will exceed 100,000. On the basis of these incomplete reports there will be at least 170,000 such units in operation by the end of this year. Although this represents a small proportion (5 per cent) of the tractors in use, it is over 22 per cent of the 1949 domestic shipments of wheel-type tractors for all kinds of farm use.

Another factor of considerable significance, although not susceptible to statistical presentation at this time, is the rapid rate at which new factory equipment for L.P. gas is being offered for trucks, buses, tractors, and engines. A recent development has been the extension of the Fageol 10 : 1 compression engine to truck applications. Numerically, the number of new tractor models equipped for L.P. gas is particularly impressive.

Will Take a Lot of Doing

Although the authors agree with the general statement so often made by automotive engineers that all the engineering principles are known to permit the manufacture of engines for maximum performance with L.P. gas, we are also of the opinion it will take a lot of doing to achieve the best results. We urge that in judging the future and long-term potentialities of L.P. gas as a direct motor fuel, it be done on the basis of engine-equipment combinations representing practical approximations of the ideal. If sound conclusions as to the long-term potentialities are to be reached there must be these practical approximations of the ideal on both the fuel and equipment sides of the equation.

There is a very good possibility that the advantage of perfect vaporization, namely the improved mixing of air and fuel and distribution to the several cylinders of the multicylinder engine, may turn out to be the most important advantages for L.P. gas as a motor fuel (see Table 1). Over a long period of years, during which sporadic efforts have been made to evaluate L.P. gas as a motor fuel, we have been consistently surprised by the mileage results. In nearly every instance these have been more favorable than would have been predicted from conventional considerations of compression ratios, octane numbers, and B.t.u. values. The only way we can explain these results is on the basis of improved manifold distribution.

TABLE 1—MAJOR ADVANTAGES AND DISADVANTAGES OF L.P. GAS AS A MOTOR FUEL

1. **Advantages:**
   - (a) Perfect vaporization.
   - (b) Very high octane number.
   - (c) Uniformity.
   - (d) Clean burning.
   - (e) No tetraethyl lead.
   - (f) Freedom from impurities, sulfur, gum, etc.
2. **Disadvantages:**
   - (a) Low specific gravity, low heat content per gallon.
   - (b) Requires pressure storage.

In this connection it is perhaps worth noting that almost half of the improvement in automotive engine performance of the past two decades has been attributed to engine-design factors made possible by the increased volatility of gasolines. A considerable portion of this resulted from reductions in intake manifold temperatures but there can be little doubt that some of it results from improved manifold distribution as well.

To give some idea of the way in which an L.P. gas engine can achieve ideal manifold distribution of air and fuel a schematic diagram (Fig. 1) is shown. The diagram is for an L.P. gas motor-fuel system. The filtered liquid fuel from the storage tank is reduced in pressure, from the storage-tank pressure, to about 6 to 8 psi. While under this reduced pressure the fuel is completely gasified through a heat exchanger, a set of coils surrounded by the engine coolant. The dry gas then passes through a low-pressure regulator which shuts completely off unless the engine pulls a vacuum. If and when the engine stops the flow of fuel stops.

From the low-pressure regulator the gaseous fuel goes to the carburetor, which is actually a gas-air proportioning valve, where it is completely mixed with air in the required ratio. This mixture of gaseous fuel and air passes through the intake manifold to the engine cylinders.

Vapor-Withdrawal Alternative

An alternative to the liquid withdrawal system is the vapor-withdrawal system in which dry gas, withdrawn from above the liquid in the storage tank, passes through the two pressure regulators to the carburetor without requiring the heat exchanger.

It is obvious that in such systems the fuel will be more completely vaporized, that it will be more accurately proportioned with the air, that it will be more thoroughly mixed with the air, that it will be more accurately proportioned to the several cylinders, and that it will burn more completely. In engines using liquid fuels none of these desirable features is attained so easily as with L.P. gas. In fact, the physical characteristics of L.P. gas force their complete attainment whereas engineering compromises are necessary all along the line with liquid fuels.

The basic fact that the fuel-air induction system of a propane-burning engine deals with a completely gasified fuel no doubt explains in a large measure how such engines are able to get much better mileage than would be expected on the basis of the B.t.u. content of the fuel and the thermal efficiencies of the engine in comparison with engines using liquid fuels.

We have not been able quantitatively to evaluate this factor as yet. Actually it is something for automotive engineers to do rather than petroleum engineers. However, the fact of improved manifold distribution for L.P. gas is rather strikingly demonstrated in a qualitative way by experiments we are conducting with our G.M. experimental engine (12:1 compression ratio).

Idling Performance Phenomenal

When using L.P. gas in this experimental engine its idling performance with lean mixtures is nothing short of phenomenal. With a fuel-air ratio of 14:1 it will idle down to 375-400 r.p.m. and functions without any roughness from this low speed up to the driving speeds. In contrast, when the engine is operated on a dream gasoline—a mixture of isooctane and diisopropyl—it will not idle at an air-fuel ratio leaner than 13:1 and its minimum idling speed is 475-500 r.p.m. in order to get reasonably smooth operation.

The very high octane numbers of L.P. gas in comparison with the octane numbers of gasolines is of primary interest in design considerations for L.P. gas engines. The efficiency of a given internal-combustion engine in converting heat to power is primarily determined by its compression ratio, with the upper limitations being those imposed by the abilities of the fuel and engine to withstand the higher combustion pressure imposed.

Offsetting the high octane numbers of L.P. gas, is its low specific gravity, which in turn results in a low heat content per gallon. Propane has a heat content of 92,000 B.t.u. per gallon as compared with an average gasoline which will have a heat content of 118,000 to 120,000 B.t.u. per gallon. Thus, on the liquid volume basis, propane has 27 per cent less heat energy than gasoline. This would lead one to conclude that even were L.P. gas burned in an engine which was improved in thermal efficiency by 15 per cent there would be an over-all loss in economy, or mileage, of about 12 per cent. However, as previously indicated, from the results of many field tests, the added effects of improved manifold distribution and clean burning apparently more than offset this deficit.

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An advantageous quality of L.P. gas, which may be overlooked, is its uniformity. Nature is very good to us in this regard. In the field of motor fuels, L.P. gas is the nearest approach to chemical purity that has yet appeared on the scene. In fact, if the motor-fuel use of L.P. gas is concentrated on propane and propane-propylene mixtures this ideal may be achieved. Except for refinement propane will have the same physical and chemical characteristics wherever procured. Even when the butanes and butylenes are included in the L.P. gas picture there results a comparatively small range in physical and chemical properties.

In the motor-fuel use of L.P. gas, the intake and combustion deposits in the cylinders and on the valves normally encountered in gasoline-burning engines are almost entirely eliminated. There is no liquid entering the cylinders to wash oil from the cylinder walls or to work past the piston rings to dilute the crankcase oil. There is much less contamination of the lubricating oil with products of combustion. Valve and ring sticking and valve burning are minimized. The lubrication requirements are more clearly defined. The greater freedom from impurities and the absence of antiknock compounds beneficially affect the operation of L.P. gas engines. All of these factors relating to the clean-burning characteristics of L.P. gas are of considerable importance to designers and users of L.P. gas engines.

When all these basic advantages and disadvantages of L.P. gas are taken fully into account within practical limitations in the design of engine-equipment combinations it seems almost a foregone conclusion there will result products capable of rendering very satisfactory performance. As is well known, a few have already pioneered with very good results.

Availability of L.P. Gas

In a recent paper[1] one of the authors presented considerable data pertaining to the past, present, and probable future availability of liquefied petroleum gas in comparison with potential markets as a direct motor fuel in commercial transportation and in agricultural and other off-the-highway uses. Those data are recast and in some instances amplified in the following figures and tables.

The ratio of natural gas in our total petroleum has been increasing for a considerable period. Natural gas is potentially about twice as productive of L.P. gas as is crude oil when comparison is made on a weight or B.t.u. basis and when some refinery L.P. gas is earmarked for butanizing gasoline. Thus, it is of considerable significance for the long-term aspects of new markets for L.P. gas that natural gas may soon constitute 70 per cent of our petroleum reserves.

Fig. 2 shows the production of L.P. gas in 1949 was 554,000 bbl. per day, an increase of 256 per cent over the production of 155,000 bbl. per day in 1940. The production of L.P. gas projected for 1960 is 1,585,000 bbl. per day, which is an increase of 187 per cent over the 1949 production and amounts to an increase in production of over a million barrels per day. Although these are very large quantities it seems reasonable that such percentage increases, or even greater ones, can be achieved.

There are a number of new technologic and economic factors in both natural-gas and refining operations which create pressures to bring about the future production volume indicated for L.P. gas in Fig. 2. As a matter of fact, even higher production rates are indicated. As nearly as the authors can foresee the only limitation on future production of L.P. gas up to about 80 per cent of the full potential is the size of the market potentials at prices justifying the cost of liquefaction and processing. The fact that these pressures have come into existence in the petroleum industry for increased production of L.P. gas beyond the capacity of past major markets to absorb it accounts for a great interest by many in the petroleum industry in L.P. gas as a direct motor fuel.

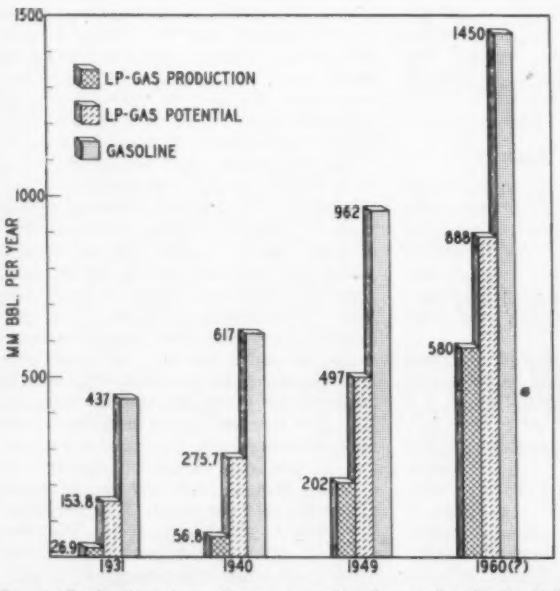

Fig. 2—Production of gasoline compared with actual and potential production of L.P.G.

TABLE 2—NONPASSENGER CAR USES OF DOMESTIC GASOLINE
(Per cent of total production)

	1930	1940	1949	1960
Trucks	16.0	22.0	21.0	23.8
Buses	2.5	2.2	1.5	1.0
Tractors*	3.9	6.7	9.2	11.8
Others†	4.5	6.7	9.0	11.6
Total	26.9	37.6	40.7	48.2

*Estimate based on the number of tractors multiplied by estimate of annual average consumption. †Assumes half of the tractor fuel is gasoline.

TABLE 3—FUTURE POTENTIAL SUPPLY OF AND DEMANDS FOR L.P. GAS
(Millions of barrels per year)

Total potential supply: 915		
Estimated production (min. to max.)		600-730
Demands for chemicals, industry, domestic	150	
Demands for refinery feed stock, mostly aviation	130	
Demands for butanizing gasoline	60	
Total other demands		340
Available for use as direct motor fuel		260-390

For long-range considerations it is useful to look at the amount of the various fuels in our petroleum reserves. Based on calculations similar to those involved in earlier figures it is estimated that for every gallon of gasoline in our reserves of natural gas, natural-gas liquids, and crude oil there was 0.48 gal. of L.P. gas in 1931, 0.61 in 1940, 0.81 in 1949. With this trend continuing there may soon be a gallon of L.P. gas for every gallon of gasoline in our reserves of petroleum, a possibility of great significance in the present discussion.

Having estimated the probable practical magnitude of L.P. gas production it is in order to examine the probable magnitude of the potential gasoline market. This is done in Table 2. It is to be noted these demands were about 27 per cent of the total in 1930, and that this proportion had increased to about 41 per cent in 1949. It is estimated the proportion will continue to increase to about 48 per cent in the next decade or so.

In 1949, the production of gasoline was 962,000,000 bbl. Looking forward to about 1960 the same markets will require about 1,500,000,000 bbl. Passenger cars, aviation, and exports will consume about 780,000,000 bbl. of this and trucks, tractors, buses, and nonhighway uses will consume the other 720,000,000 bbl. In comparison with this demand, the potential supply of and other demands for L.P. gas as estimated for about 1960 are shown in Table 3.

(Continued on page 88)

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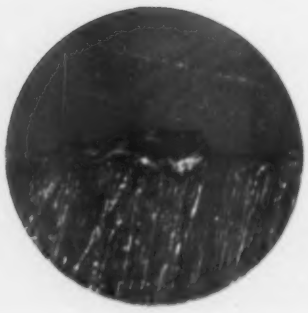

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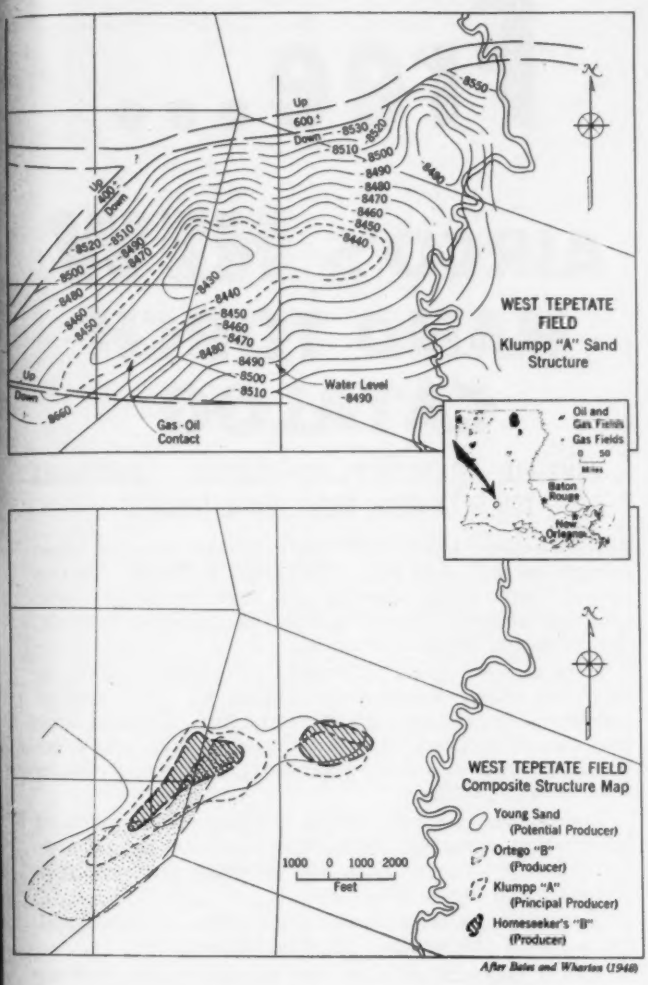
Gulf Coast Anticlinal Accumulation in Downblock — West Tepetate, Louisiana



After Bates and Wharton (1948)

SECOND only to the salt dome in importance as a trap for hydrocarbons along the Gulf Coast of Louisiana and Texas is the elongate anticline in which accumulation is in the downblock of a fault. Elsewhere than in these coastal districts accumulation is almost always in the upblock. The Gulf Coast faults parallel the shoreline and the strike of the gulfward dipping sediments. The shore-side block has dropped; on this block next to the fault plane is an anticline with long axis parallel to the fault. Oil moving updip from the direction of the gulf has been trapped in this anticline, and either the fault on the north flank or the oil-water interface limits production in that direction.

Sometimes called the "Tepetate type" structure, because of its occurrence at Tepetate, Louisiana, downblock anticlinal accumulation is illustrated here by the adjacent West Tepetate field*. This lies about 40 miles northeast of the town of Lake Charles in the northeastern corner of Jefferson Davis Parish.

The structure map is contoured on the Klumpp "A" oil sand, which is the principal producer. The West Tepetate anticline is a low gentle feature with only 60 to 70 ft. of closure above the oil-water level. The dips range from about 100 to 200 ft. per mile at the Klumpp level. The fault on the north side has a displacement of about 600 ft.

The lower figure is a composite structure map made by superimposing approximately equivalent contours from each of four structure maps. This composite shows that during the growth of the West Tepetate anticline the zone of greatest uplift shifted northward and lengthened in an east-west direction.

Producing section in West Tepetate field lies below the Second Marginulina sand in a series of sandstones commonly considered to be Middle Miocene in age. The average depth of the Klumpp "A" reservoir is 8,500 ft.

The uplift is assumed to have been caused by the deep-seated intrusion of salt. After (or during) the arching of the strata above the salt core the hydrocarbons in the various permeable layers moved upward toward the structural crest where they became trapped.

*Fred W. Bates and Jay B. Wharton, Jr., "Geology of West Tepetate Oil Field, Jefferson Davis Parish, Louisiana," Bull. A.A.P.G., Vol. 32 (September 1948), pp. 1712-1727.

OIL AND GAS TRAPS

by Kenneth K. Landes*

THE final stage in the natural history of an oil and gas field is the trapping of the hydrocarbons into an accumulation of exploitable size. The first prerequisite to accumulation is an adequate reservoir rock. The second prerequisite is that the reservoir be closed so that the hydrocarbons will be trapped within.

A closed reservoir, hereafter referred to as the trap, is a body of reservoir rock completely surrounded above a certain level by impervious rock. The amount of closure is the vertical distance between the "certain level" and the highest point reached by the reservoir rock. All traps must have closure, but the concept is best illustrated in elliptical anticlines and domes, which can be mapped readily by structure contours. Closure begins at the level of the lowest possible closed contour and extends upward to the apex of the structure. The approximate amount of closure can be calculated by multiplying the number of closed contours by the contour interval; the actual closure lies within one contour interval of this figure.

Amount of closure is also the maximum vertical distance through which hydrocarbons can accumulate in the reservoir rock; any additional oil would flow out of the structure beneath the inverted lip of the trap. Rarely are traps completely filled with oil. More commonly the oil-water contact lies well above the lowest closed contour.

Structural relief is the maximum vertical distance between the top of a fold and the bottom of the deepest neighboring syncline. It is always greater than the closure. The structural relief gives some idea of the extent of the local "gathering area" downdip from the trap.

Several classifications of traps have been proposed. Wilson,[1] before presenting his own classification in a

*Professor and chairman, Department of Geology, University of Michigan, Ann Arbor. Author of textbook, Petroleum Geology, to be published in February; this material therefrom. Copyright 1951 by John Wiley & Sons, Inc.

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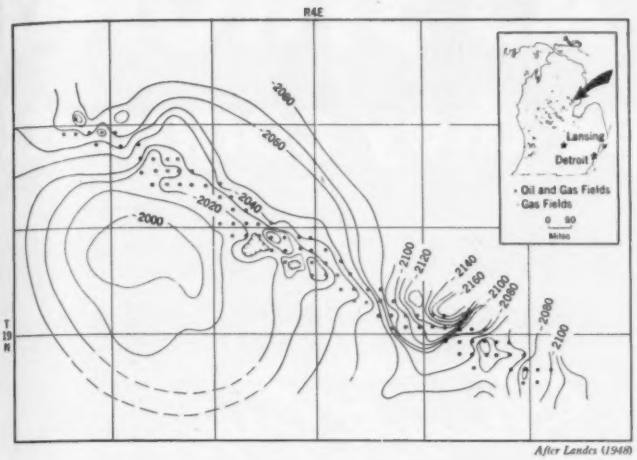
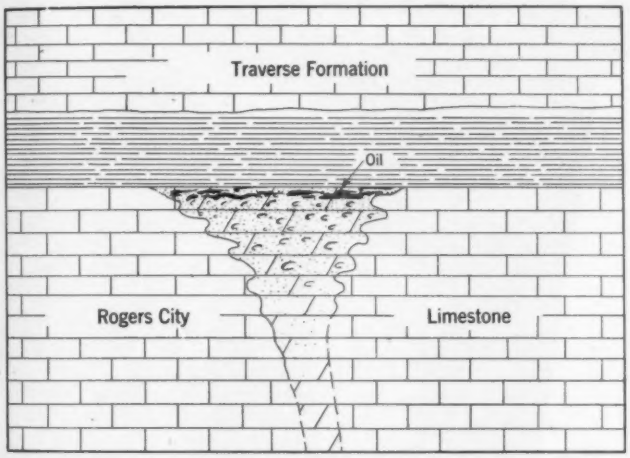
Example of Overlapped Dolomite Porosity — Deep River, Michigan, Oil Pool



After Landes (1948)



Hypothetical Cross-Section

Limestone
Dolomite
Shale
Porosity

A RELATIVELY new field illustrating the accumulation of oil in a patch of locally dolomitized limestone is Deep River pool in Arenac County, Michigan*. This pool was discovered on December 30, 1943. Subsequently about 150 wells were drilled of which over one-third were failures. This abnormal percentage of dry holes after the discovery of a pool was due to the extremely narrow width of the producing zone as can be seen in the upper figure.

Upper figure in the illustration is a subsurface map contoured on base of the Devonian Traverse formation which immediately overlies the reservoir rock. The structure is that of a dome, but Deep River oil field, where on the dome at all, is far down on the northeast flank and there is absolutely no relationship between accumulation and structure. Deep River gas field, producing from the Mississippian Berea sandstone, occupies the highest part of the dome.

Reservoir rock is the Rogers City formation of Devonian age. Normally the Rogers City formation is limestone, but at Deep River, **where productive of oil** it is a porous dolomite. The unsuccessful wells failed to find oil, porosity, or dolomite. Conversely where the limestone has been dolomitized it is both porous and oil bearing in this general vicinity.

Lower figure is a hypothetical cross-section of the Deep River producing zone. The areal distribution of the dolomitized zone beneath the Traverse can be accurately mapped due to the presence of 57 dry holes surrounding Deep River oil pool. However, the third dimensian is entirely unknown; it is assumed that the dolomitized zone is vertical or nearly so, because none of the dry holes, regardless of depth drilled, have passed through this zone.

It has been suggested that the localized porosity has been the result of an excess of solution over precipitation by dolomitizing solutions passing along a vertical fissure through the Rogers City formation. Apparently this dolomitized porous zone afforded sanctuary for oil which moved in after dolomitization had taken place. Presumably, but yet to be proved, the oil is underlain by water and has been impounded at the top of the porous zone by the presence of impervious shale at the base of the overlying Traverse formation.

*Kenneth K. Landes, "Deep River Oil Field, Arenac County, Michigan," Structure of Typical American Oil Fields, (A.A.P.G., 1948), Vol. 3, pp. 299-304.

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paper published in 1934, reviewed those put forth by others. Since then several other classifications have appeared.[2] The classification which follows is a simplification of that originally submitted by Wilson[3] and modified by Heald.[4]

Classification of Oil and Gas Traps

1. Structural traps.
a. Folds.
b. Faults.
c. Fissures.
2. Varying permeability traps.
a. Varying permeability caused by sedimentation.
b. Varying permeability caused by ground water.
c. Varying permeability caused by truncation and sealing.
3. Combined structural and permeability traps.

Structural traps are the result of movements of the earth's crust. The second class (2) contains all traps in which closure is due to more or less abrupt termination of permeability in a direction parallel to the bedding without the intervention of a fault. The term most often used for this class is "stratigraphic" trap, but Wilson[5] points out that it is not exactly applicable, for the strata may continue even though the permeability does not.

Oil accumulations may result from single traps. A single trap is illustrated by the accumulation of oil in a reservoir rock across the top of a structural dome. An example of multiple trapping is the occurrence of oil beneath an asphalt seal in one part of a field and beneath an anticlinal axis in another part. Another example is presented by traps all of the same nature, as a series of small domes superimposed upon a large anticline.

Combination trapping is very common. It differs from multiple trapping in that the traps are mutually dependent in closing the reservoir. Most of the accumulations credited to varying permeability are actually due to a combination of erratic permeability and structural position. Some of the fields so credited are entirely structurally controlled, as pointed out by Sanders.[6] Examples are accumulations lying across anticlines and containing local barren spots due to erratic permeability. In these places the trapping is entirely anticlinal, but the distribution within the trap is controlled by the local porosity.

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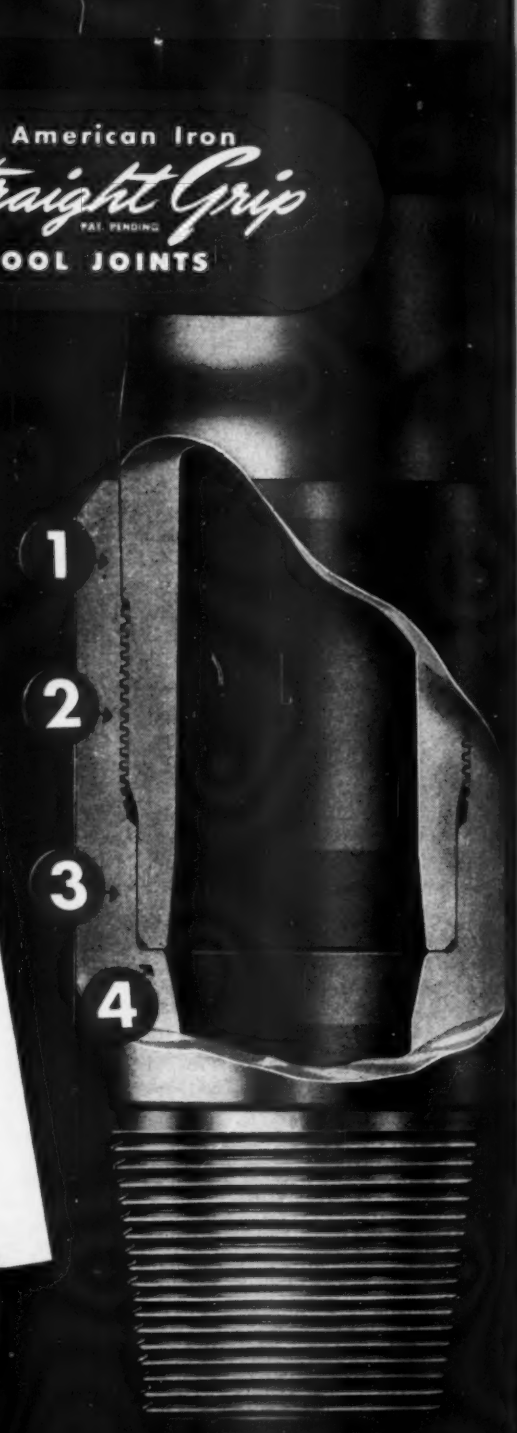

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Overlapped Dolomite Wedge — Apco Field, Texas

APCO field* is south of the Pecos River in southwestern Texas. Although shallow oil had been produced in this area since 1929 the deep pay was not discovered until 1939.

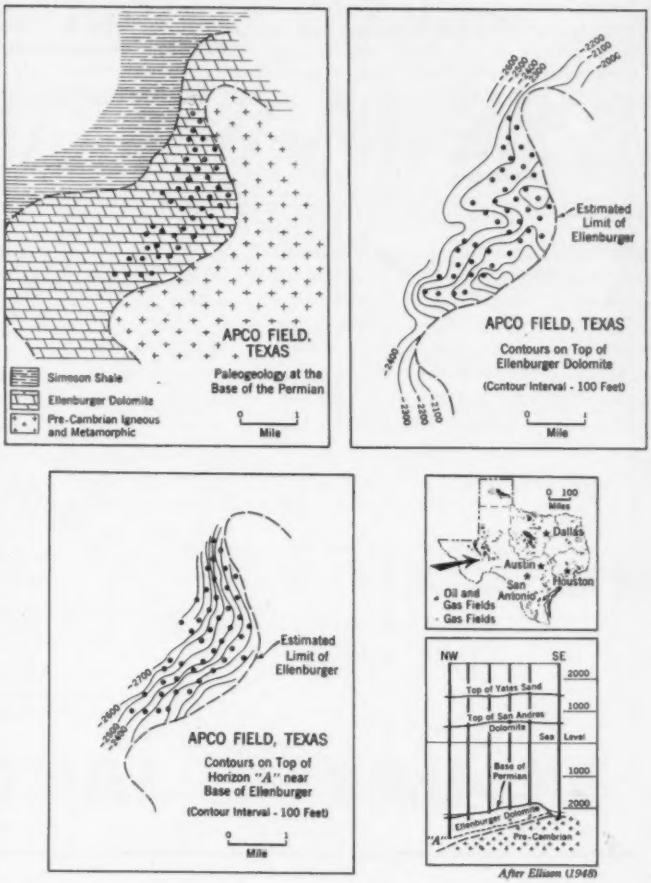
The surface rocks in the vicinity of Apco field are Quaternary and Recent alluvial sediments, ancient deposits of the Pecos River. The subsurface section includes Cretaceous, Triassic, Permian, Ordovician, and pre-Cambrian rocks. The greater part of the stratigraphic section between the thin veneer of surficial deposits and the oil-reservoir rock consists of Permian dolomites.

Main producing zone of Apco field lies within the Ellenburger formation of Lower Ordovician age. The Ellenburger is about 800 ft. thick at Apco and consists primarily of gray to buff siliceous dolomite. It apparently underwent considerable weathering and leaching during pre-Permian emergence with the result that vuggy porosity has been developed in three persistent zones lying from 150 to 300 ft. above the base. The interstitial porosity has been augmented by fractures. Exposure to weathering also produced an enrichment of siliceous material at the Ellenburger surface due to differential leaching.

Accumulation in Apco field is in a buried hogback of Ellenburger dolomite which laps up on the flank of a hill of pre-Cambrian rock. Trapping is due to the blanket of Permian shale which overlies not only the dip slope of the hogback, but also the scarp face and the pre-Cambrian hill. Oil traveling up through porous zones in the tilted dolomite was impounded by this seal.

Upper left figure in the illustration shows the paleogeology at the base of the Permian. The regional dip is to the northwest, and pre-Permian erosion beveled the Ordovician Simpson shale, the underlying Ellenburger dolomite, and the pre-Cambrian complex. The next figure shows, by means of contour lines, the topography of the top of the Ellenburger where it is in contact with the unconformable overlying Permian shale. Fairly consistent dips to the west show the dip slope of the hogback. Also shown is the rim of the hogback and the eroded scarp face.

*Samuel P. Ellison, Jr., "Apco Field, Pecos County, Texas," Structure of Typical Oil Fields (A.A.P.G., 1948), Vol. 3, pp. 399-418.



After Ellison (1948)

The third drawing shows the actual rock structure, a fairly consistent westward dipping monocline. The cross-section from northwest to southeast through Apco field shows the Ellenburger hogback with gas cap and oil-water interface.

Some great oil fields are due to structural trapping; others are the result, in part at least, of varying permeability. Several attempts have been made to evaluate the relative importance of these two types of accumulation. According to Levorsen: "Of the 22 largest oil pools in the United States, according to The Oil and Gas Journal's list, over half of the oil production was obtained from pools in which the dominant trap-making element was a change from porosity to nonporosity."[1] Wilson[2] and Hornbaker[3] each made a census of the published descriptions of oil fields. Wilson studied the articles in Volumes 1 and 2 of Typical American Oil Fields (A.A.P.G., 1929) and found that approximately half the fields that were described produced from anticlines or domes without complications. Hornbaker surveyed all the publications of the A.A.P.G. and other sources and found that 57 per cent of the descriptions covered fields with structural trapping and the remaining 43 per cent fields with varying permeability an important factor in the accumulation.

Of course a census of published descriptions tends to minimize the importance of the commonplace, in this case anticlinal accumulation, because of the greater interest in the unusual. On the other hand, structural traps are much more readily discovered than the varying permeability type, and therefore it is highly probable that a greater proportion of the total number of varying-permeability traps remains to be discovered than of structural traps.

The conclusion appears justified that structural position or attitude is of utmost importance, being the sole factor in many accumulations and a contributing factor in most others, and that varying porosity has played an important role in oil trapping in many fields and its relative importance is likely to increase in the future.

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Domes — San Joaquin Field, Venezuela

SAN JOAQUIN field is one of a group of fields lying in the central part of the State of Anzoategui, in eastern Venezuela*. The San Joaquin and the neighboring Santa Ana domes were first outlined as the result of air-photograph study and surface geological reconnaissance in 1934. This was followed by a seismograph check and the drilling of the discovery well for Santa Ana field in 1936. The discovery well for San Joaquin field was completed in 1939.

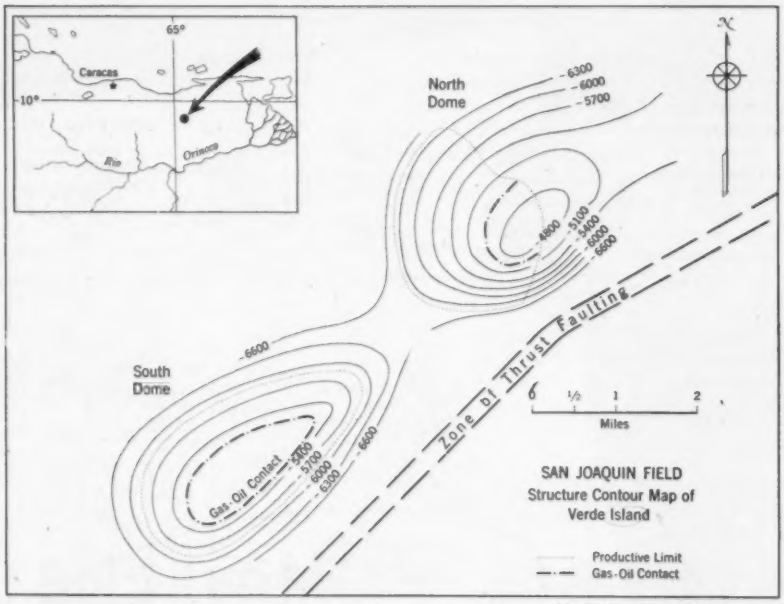
The map shows by means of contours the structure of the two domes which constitute San Joaquin field. The datum for the contours is the Verde I sand, one of many oil-bearing sandstones which lie within the Oficina formation of Oligocene-Miocene age. The domes are believed to be the result of drag over a northwest dipping zone of thrust faulting; the fault planes crop out to the southeast as shown on the map.

Oficiana formation is from 7,500 to 10,000 ft. thick. It contains 28 sands which have produced oil, and at least 15 more are known to contain gas. Within the productive section of the Oficina, sandstone beds constitute but 8 per cent. Only the uppermost 1,900 ft. of the underlying Merecure formation (Upper Eocene-Lower Oligocene) has been explored as yet. This section is about 50 per cent sandstone and 50 per cent shale.

Oil and gas have been found within the sandstones wherever tested. The sandstones are probably interconnecting so constitute a singe reservoir.

The south dome has a closure of about 1,200 ft. In the Verde I sand the oil-water contact lies about 600 ft. above the saddle between the north and south domes. The top of the dome contains a gas cap. The oil-water contact is several hundred feet lower on the north dome; a gas cap is present there also. The Verde I sand lenses out to the east and north so only the west end of the north dome is productive at this stratigraphic level.

San Joaquin field illustrates almost perfectly the trapping of oil at the top of a dome-shaped structure where a previous reservoir rock is present. Some gas has separated out from the oil and has accumulated below the very top of the trap.



After Funkhouser, Sass, and Hedburg (1948)

*H. J. Funkhouser, L. C. Sass, and H. D. Hedberg, "Santa Ana, San Joaquin, Guario, and Santa Rosa Oil Fields (Anaco Fields), Central Anzoategui, Venezuela," Bull. A.A.P.G., Vol. 32 (October 1948) pp. 1851-1908.

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Comparative Operating Data

(Continued from page 80)

In Table 3 the minimum estimated future production of L.P. gas is predicated on past production trends as in Fig. 3. The maximum estimated future production is on the assumption it will be economically feasible to produce 80 per cent of the total potentially available. The data of Table 3 indicate there will be enough L.P. gas to capture between 36 and 53 per cent of the future truck, bus, tractor, and other nonhighway markets for gasoline.

It is indeed startling to realize that L.P. gas, already the fourth largest volume liquid product of petroleum, may soon move into the third position and may even assume second place among major liquid fuels. The net conclusion to be derived from these data is that although other circumstances may retard the direct use of L.P. gas as a motor fuel, availability, both the immediate practical availability and the long-range potential availability, will be sufficient with a wide margin of safety for any practical development program.

It should be obvious that all the forms of transportation available to the other products of petroleum are also available for the transportation of L.P. gas.

The number of L.P. gas tank cars is increasing very rapidly. There were about 4,200 in 1946 and about 10,000 now, with an estimated 2,500 on order. It is estimated that one tank car is needed for the railroad transportation of each 150,000 gal. per year of L.P. gas.

There are no statistics available relating to L.P. gas tank trucks but transportation experts advise that this form of transportation is increasing even more rapidly than railroad transportation. In our own operation we are currently moving by tank truck about half the volume of L.P. gas moved by tank car.

At least two pipe lines are transporting propane and both these pipe lines as well as several others transport butane.

Two tankers for the ocean transportation of L.P. gas are already in service, one serving the East Coast and the other serving Brazil. Warren Petroleum Co., the pioneer in water transportation, is about to launch a barge as the progenitor of inland water transportation for L.P. gas.

One of the most interesting aspects of extending these bulk forms of transportation to liquefied petroleum gas is that all the newest engineering and industrial advances can be applied to them. The savings thus effected may in some instances make

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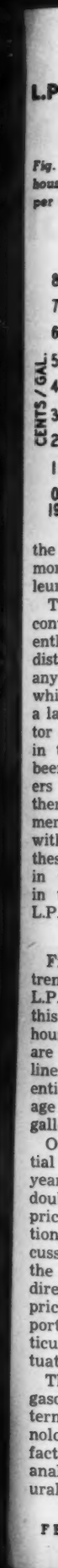
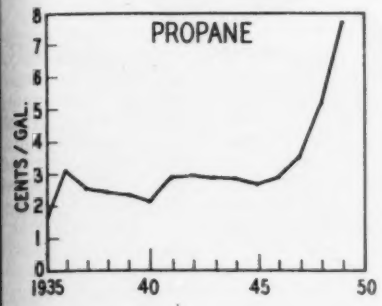
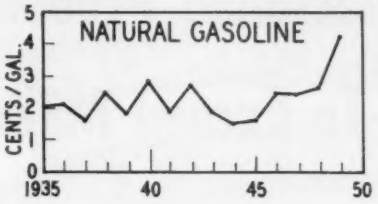
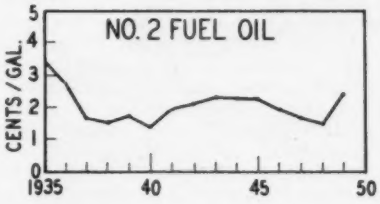


Fig. 3—Price differentials under house-brand gasoline in cents per gallon, f.o.b., Group 3.







the transportation of L.P. gas even more economical than for other petroleum products.

The authors would be the last to convey the impression that the presently established transportation and distribution facilities for L.P. gas are any more than a good foundation on which to base facilities adequate for a large demand for L.P. gas as a motor fuel. We can report, however, that in the short time our company has been contacting its wholesale dealers who would resell to small fleets, there is immediate recognition of the merchandising possibilities coupled with enthusiasm for the venture. And these people are thoroughly steeped in the economic problems involved in the bulk and retail handling of L.P. gas.

Prices

Fig. 3 shows certain past price trends of significance in considering L.P. gas as a direct motor fuel. In this figure the differentials under housebrand gasoline from 1935 to date are shown for propane, natural gasoline, and No. 2 fuel oil. The differentials are based on annual average Group 3 prices in cents per gallon.

Of greatest interest is the differential for propane, which in recent years has increased considerably. Undoubtedly this relative decline in the price of propane reflects the condition of oversupply previously discussed. It also accounts in part for the great interest in L.P. gas as a direct motor fuel. Incidentally, the price curve for propane does not support the contention that prices, particularly yearly average prices, fluctuate violently.

The price differential for natural gasoline is perhaps of greatest long-term significance because the technology and economics of the liquefaction of L.P. gas from gases is quite analagous to the liquefaction of natural gasoline from natural gas.

A typical natural gas contains about 1.5 gal. of propane, 0.9 gal. of butanes, and 0.9 gal. of pentanes and heavier per thousand cubic feet. The "pentanes and heavier" is almost 50 per cent pentanes with rapidly decreasing proportions of hexanes, heptanes, octanes, etc. Natural gasoline is the pentanes and heavier with a little of the butanes included. Natural gasoline is too volatile for use as a conventional motor fuel and is blended with gasoline from crude oil. The production of natural gasoline has been about 10 per cent of the production of motor fuel for 30 years or more and except for the earliest period, the price relationship has approximated that shown in Fig. 3.

Much of the L.P. gas produced from natural gas to date has been that liquefied as an incidental result of the liquefaction of natural gasoline, or by comparatively minor additions to natural-gasoline extraction plants. At such plants, under corresponding conditions of liquid content, pressure, volume, and temperature of the gas it is more costly to liquefy propane and butane than to liquefy natural gasoline. However, offsetting this fundamental disadvantage are three significant facts:

1. The liquid content of propane and excess butane is usually twice as great as of natural gasoline.
2. The pressure at which natural gas is handled is rapidly increasing.
3. The volumes of natural gas being handled are rapidly increasing. Although different raw material values apply, much the same considerations hold for the liquefaction of L.P. gas (sometimes called L.R. gas) from refinery vapors. The widespread use of catalytic cracking has made refinery vapors much richer in L.R. gas.

From these considerations it seems reasonable to conclude for the long term that L.P. gas can be economically manufactured and marketed at about the same price levels as has been the case with natural gasoline, or at several cents per gallon under gasoline.

The differential for No. 2 fuel oil is shown in Fig. 3 as an indication of the approximate cost of diesel fuel. It is particularly notable that in the past for No. 2 fuel oil has been, if anything, increasing.

War and Conservation

L.P. gas as a direct motor fuel could go a long way in cushioning the essential civilian economy against the impact of military requirements of aviation and motor gasolines in wartime. The developments we have projected for the next decade might be compressed into a much shorter period under the stress of a national emergency. Of the three phases, production of fuel, distribution, and consuming equipment the authors place them in that order as to ease of consummation.

Last, but by no means least, of the incentives for the use of L.P. gas as a direct motor fuel is that of conservation of our natural fuel resources. With the prospect that the petroleum industry in its search for and production of crude oil for processes of converting crude oil to useful liquid products will soon find itself with a gallon of L.P. gas for every gallon of gasoline in its petroleum reserves, it seems self-evident that maximum and immediate effort should be devoted to the very obvious expedient of using L.P. gas as a direct motor fuel.

From the viewpoint of meeting the nation's requirements for motor fuel, the use of L.P. gas from natural gas can make a corresponding volume of crude oil twice as effective for the simple reason that it takes 2 bbl. of crude oil to make 1 bbl. of gasoline. Assuming the rapidly increasing use of natural gas can make up for the barrel of other liquid fuels made from the barrel of crude oil saved the whole barrel is conserved. Here we find a conservation factor of 100 per cent in ton-miles per barrel of crude oil.

Many, particularly in government circles, are soberly and seriously considering tremendous investments in facilities for manufacturing synthetic liquid fuels from coal and shale because of the fear of running out of crude oil, a fear not shared by the petroleum industry. Nevertheless, in L.P. gas as a direct motor fuel we have a means of greatly prolonging the life of and augmenting our supplies of liquid fuels. The development fits in with the production, manufacturing, transportation, and merchandising facilities of the automotive and petroleum industries. It is self-evident that the investment required would

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be considerably less than for substitute sources of liquid fuels.

In conclusion, the automotive and petroleum industries are confronted with a large potentialities of L.P. gas as a direct motor fuel. However, the efforts of pioneers in the petroleum, equipment, and merchandising phases have demonstrated some of the potentialities.

In a national emergency, as an additional supply of motor fuel, L.P. gas could cushion the essential civilian demands and improve military products. As a means of conserving petroleum, L.P. gas as a motor fuel can have a substantial effect. With these possibilities and incentives there is a challenge to all concerned—the many branches of the petroleum industry, the equipment manufacturers, transportation companies, legislative and regulatory bodies, and consumers—to cooperate to get the most out of L.P. gas as a direct motor fuel.

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BOOKS

PRACTICAL MICROSCOPY. By L. C. Martin and B. K. Johnson. Published by Chemical Publishing Co., 24 Court Street, Brooklyn. 124 pp. $2.50. The optical principles and physical limitations of the microscope are discussed because they are essential for its proper use. Otherwise, theory is kept at a minimum and the text is slanted toward the practical man and the student who use the microscope in their professional work and studies and wish to acquire the correct technique of handling the microscope and learn the best methods of interpreting their observations.

Asphalt Production in Venezuela To Exceed Million Barrels in 1951

PRODUCTION of penetration asphalt was initiated by Creole Petroleum Corp. in early October located on the Paraguana Peninsula of Venezuela. Although Creole has been making cutback asphalts for sale in Venezuela since 1940, this is the first manufacture of the penetration product in that country. Production of 3,500 bbl. per day of penetration asphalt is planned at Amuay Bay, a large portion of which will be exported for road building in Brazil, Cuba, Nicaragua, and other countries of the Western Hemisphere.

Venezuelan asphalt production was 345,000 bbl. in 1949 and is estimated at 744,000 bbl. this year. Creole's manufacture for 1951 is planned at 1,185,000 bbl., of which 593,000 bbl. is to be exported.

Large-scale manufacture of asphalt from crude oil began in the early 1930s and has made production from natural asphalt lakes relatively uneconomical. Largest asphalt pools or lakes in the world exist in Venezuela and Trinidad. These were formed by seepage of crude oil from underground pools and weathering of the oil reaching the surface. Through evaporation of lighter fractions the heavy, viscous asphalt deposits were left.

The great Bermudez or Guanoco asphalt lake located in Benitez district, State of Sucre in Venezuela, some 25 miles west of the Gulf of Poria, extends over 1,110 acres and its deposit has been estimated at 6 million tons. Until 1931 the New York & Bermudez Co., first organized in 1891, operated the Guanoco lake. At one time 10 tons of asphalt per day was being extracted. With suspension of operations by this company, asphalt was distributed at a lower price in Venezuela from Creole's La Salina refinery. This source was sufficient to supply Venezuela's asphalt needs until recently when expansion of road building and other construction within the country led to the import of penetration asphalt.

The importance of this petroleum product in construction and maintenance of highways and airports is reflected in the fact that 85-90 per cent of new highways built in recent years and 67 per cent of airport surfacing, in the United States, is of asphalt construction. Availability of this product has been a prime factor in the building of a Venezuelan road net. Currently there are over 1,200 miles of asphalt highways in Venezuela.

ASPHALT PRODUCTION.—At Creole's Amuay Bay refinery in Venezuela comes from the vacuum tower at the right. ASPHALT ROADS.—In Venezuela there are now over 1,200 miles of asphalt-paved roads.

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Check over the unique features of the

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See those tapered tongues on each side of the end gate that fit into mating grooves in the Spider body? These form a tight *dovetailed* joint that will not spread under the heaviest loads!

And note above how the bottom flange on the body has slotted openings to facilitate bolting it to the top flange of the tubing head. The whole unit stays rigidly in place without slipping or sliding.

Another feature that speeds operations is the wide flat platform on top of the Spider body for supporting the Slip Assembly when it is out of the bowl. And there's a ridge around the outer edge of this platform to keep the slips from sliding off when standing open.

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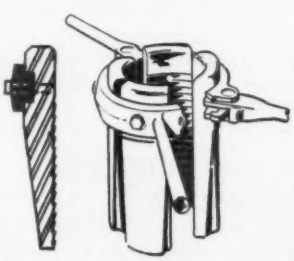
After the Spider body is in place the tubing job is ready to roll. And throughout the tubing operations, the unique features incorporated into the Unitized Slip Assembly save time, simplify work and safeguard the pipe against damage. . . .

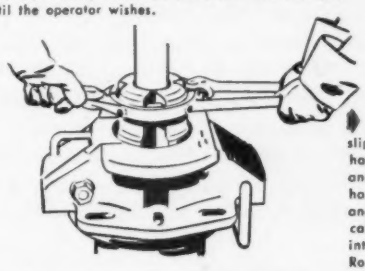


Note how the four slip segments are unitized together on a hinged tong so that they maintain exact alignment at all times. They grip together and release together, so that slip pressure around the tubing is uniform under all conditions. This eliminates swaging, kinking and other damage to pipe.

Note, also, that the slips are not merely bolted to the tong, but are grooved to fit solidly around the tong body so that all loads of holding the slips in exact alignment are transmitted directly from the slip bodies to the tong itself. *No shearing stresses of any kind are placed on bolts or other retaining parts!*

The Slips themselves are amply long—10" overall with a full 9" of gripping surface. This long gripping surface, coupled with the uniform all-around slip pressure provided by the unitized slip design, permits even the longest and heaviest tubing strings to be handled easily without risk of damaging the pipe.

A unique latch is provided that automatically locks the slips around the tubing as the handles are closed. To open this lock, the operator simply spreads the handles—no extra operations are necessary. Yet the lock holds firmly under all loads and will not open until the operator wishes.



And note how necks on the slip segments extend above the handles to provide ample clearance and protect the crew's hands against injury . . . still another feature that shows the care and thought that have gone into the design of the Baash-Ross Open End Tubing Spider.

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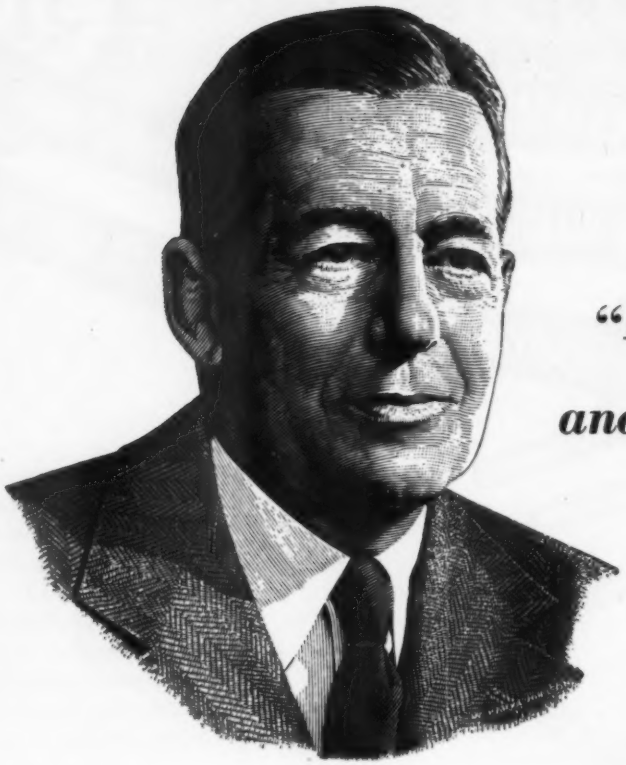

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New Inhibitor for Sulfide Corrosion

by J. A. Caldwell*

Humble has conducted numerous tests of a new product, a nontoxic, free-flowing liquid, with very little odor. Results have been very encouraging, as reported here.

The new inhibitor is added for tests on a continuously pumping well, the 2 R. P. Ricker.

CORROSION of tubing, rods, pump parts, well-head fittings, and flow lines of oil wells producing fluids containing hydrogen sulfide has long been a serious problem. In recent years this problem has been discussed by numerous investigators with the result that producers to an ever-increasing extent are becoming aware of losses which in the final analysis should be charged to corrosion. It is likely that the true cost of corrosion in sulfide-producing wells is not yet fully realized, however, because detailed records of material failures are often lacking.

A careful analysis of costs on any particular well in a corrosive area may yield a surprisingly high figure to be charged against corrosion. For example, a well operated by Humble Oil & Refining Co. in a sour-crude area of West Texas was found to have had a total of 23 sucker-rod failures attributable to corrosion during the period January 1, 1946, through June 30, 1947. The cost of replacing the broken rods and installing two strings of new rods was approximately $3,000. In addition there were during the same period four tubing failures, which cost $500. The daily average oil production from the well was less than 10 bbl.; the total oil production was about 5,000 bbl. for the period of 18 months for which the figures are given. Comparison of the figure $3,500 with the market value of 5,000 bbl. of oil shows that a substantial percentage of the gross revenue was thus lost.

*Humble Oil & Refining Co.

Ways of Controlling Corrosion

The three most obvious ways of controlling corrosion in wells producing sulfide fluids are the use of protective coatings, alloy steels, and chemical inhibitors. Several plastic coatings are available, some of which have been used to advantage in both flowing and pumping wells. Alloy steels have been used successfully, principally for sucker rods and pump parts; in many cases the higher cost of the material makes difficult the justification of its use. Chemical inhibitors have come into general use recently. These materials are usually employed for "down the hole" treatment. The possibilities of substantially reducing at reasonable cost the corrosion now occurring in sour-crude wells appear to be considerable.

A new inhibitor for sulfide corrosion in producing oil wells has been developed by Humble and has been placed on the market under the trade name of "Corexit."

During the past several years Humble has carried on an active research program on corrosion. Part of this research included laboratory testing of numerous available materials for their effectiveness as corrosion inhibitors, and from this effort there were developed new synthetic inhibitors. Consideration of price will a present prevent the use of a number of apparently effective chemicals, but the research has yielded several of reasonable cost which show considerable promise.

In the experimental work the fact has been kept in mind that certain auxiliary properties are desired in a corrosion inhibitor for treatment of oil wells. Some of these are:

1. The inhibitor should be a free-flowing liquid or easily dissolved solid.
2. It should have no objectionable odor.
3. It should be nontoxic.
4. It should be available at reasonable cost.

Method of Injecting Inhibitors

In conjunction with laboratory research, field trials of various inhibitors have been under way for several years in sour crude areas of West Texas. The inhibitor is injected into the annulus between tubing and casing, so that it goes to the bottom of the well and travels up the tubing to the surface with the produced fluids. Chemical feeders operating from the walking beam of the well, and gravity-feed lubricators have been used to inject the chemical.

An initial amount of the inhibitor, usually 5 gal., is batched into the annulus, and by a simple piping arrangement the inhibitor and well fluids are circulated for 24 hours in the closed system consisting of annulus and tubing. Continuous injection by means of a chemical feeder or daily batch injection by means of a gravity-feed lubricator is then started.

Reduction of Tubing Corrosion

Corexit has shown very encouraging results. This inhibitor is a nontoxic, free-flowing liquid, with very little odor. A test of the product was started in 11 and 12 W. R. Settles, Howard-Glasscock field, early in 1949. Each of these wells pumped continuously from a depth of 2,400 ft. and produces about 30 bbl. of oil and 30 bbl. of water per day. Rod failures

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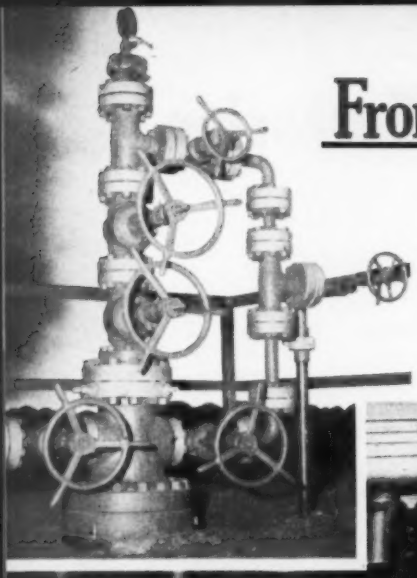

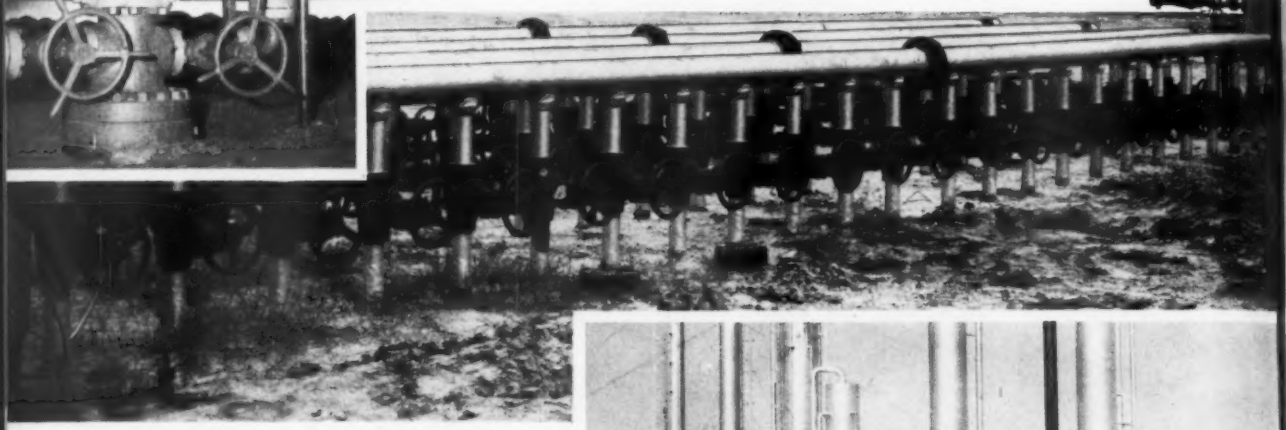

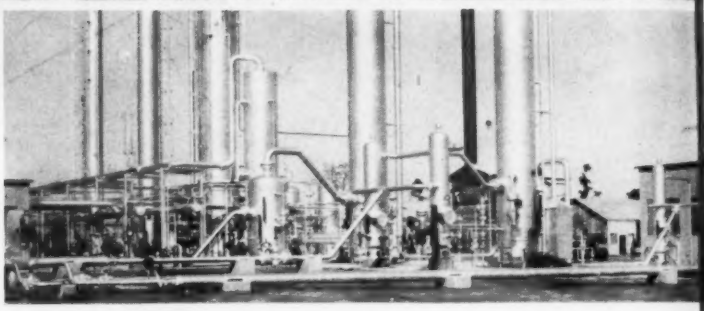

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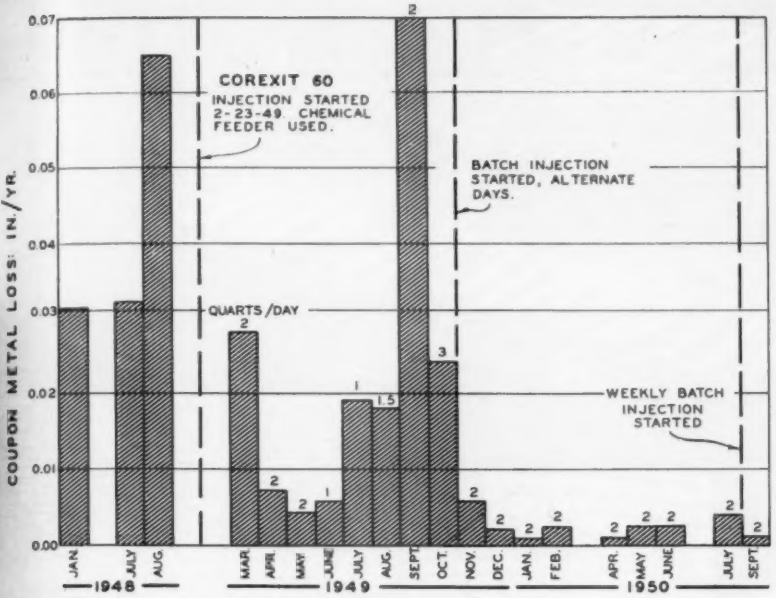
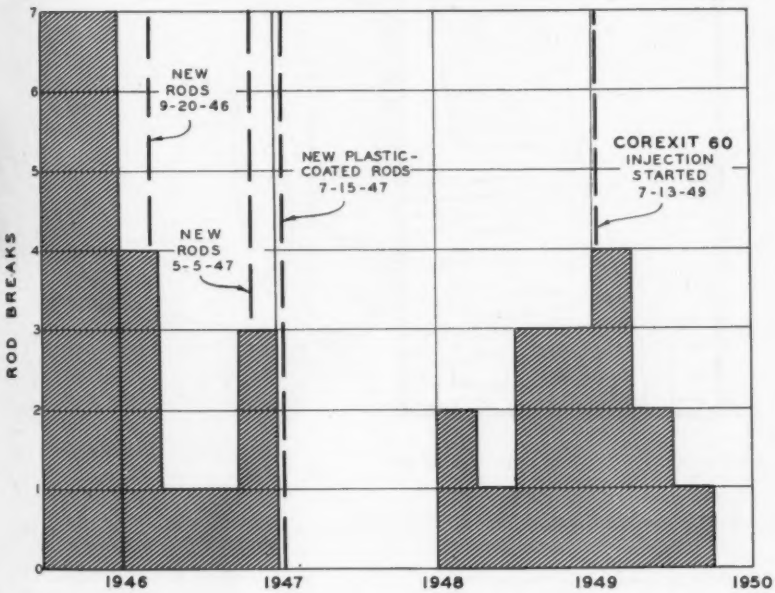


Effect of inhibitor injection on corrosion of flow-line coupons, on the 12 W. R. Settles, Howard-Glasscock field.



Effect of inhibitor on number of rod breaks, on the A-8 R. P. Ricker, McCamey field.

have been few, but tubing failures have been frequent.

A string of tubing which consisted partly of 600 ft. of plastic-coated pipe and partly of black pipe in good condition was installed in 11 Settles in January 1948. When this string was pulled for inspection late in the year, it was found that many of the joints of both the coated and uncoated pipe were badly corroded and the mud anchor was completely penetrated. Injection of Corexit was started in 11 Settles in February 1949. As of this writing, there have been no tubing leaks in this well resulting from corrosion since the start of the test. After the initial treatment, the inhibitor was used in amount such that the daily cost of chemical ranged between 50 cents and a dollar.

A string of used tubing in good condition which had been newly plastic coated was installed in 12 Settles in September 1948. It was necessary to pull the tubing four times in the next 66 days because of failure of one or more joints, either by complete penetration of the pipe or failure at the threads. The coated pipe was removed and a string of new uncoated pipe was installed; another pulling job was necessary in about 2 months because one joint of tubing corroded through during the period. Treatment with Corexit was started in February 1949 and was continued for 3 months at an average cost for material of $1 per day. There were no tubing failures during this period.

To determine the minimum amount of inhibitor needed the daily treatment was reduced such that the material cost was 50 cents per day. Three tubing failures were then experienced, the first of which occurred in August 1949, indicating that on insufficient quantity of the inhibitor was being used. The amount of inhibitor injected was increased in October 1949 to a material cost of $1 per day. There have been two subsequent tubing leaks, one in March, and one in April 1950.

Reduction of Rod Failures

Similar tests of Corexit have been made in McCamey field of West Texas. Treatment of A-2 R. P. Ricker was started in February 1949. This well pumps continuously from a depth of 2,200 ft. and produces about 5 bbl. of oil and 25 bbl. of water per day. It is not a highly corrosive well when compared with some others in McCamey field but it had 11 rod breaks in 1947 and 7 rod breaks in 1948 because of corrosion. Through April 1950 when the test was temporarily discontinued, there had been two rod breaks since start of chemical injection; cost of treatment, except for the first month, was approximately 50 cents per day.

Injection of Corexit into A-8 R. P. Ricker, McCamey field, was started on July 13, 1949. This well pumps continuously from a depth of 2,200 ft. and produces about 9 bbl. of oil and 175 bbl. of water per day. New plastic-coated rod and tubing strings were installed in this well in July 1947, following difficulty in keeping the well on regular production because of frequent rod breaks. There were no rod breaks during the latter half of 1947 and first half of 1948. There were three rod breaks in the second half of 1948 and nine rod breaks in the first 7 months of 1949, three of which occurred in July. Eleven of the twelve rod breaks are known to have occurred in the upper 975 ft. of the string; the location of the remaining breaks is not known.

When injection of Corexit was started, no change was made in the rod string even though many of the rods were known to be deeply pitted. However, during an inspection on September 30, 1949, 14 pitted rods (350 ft.) at the bottom of the string were replaced with new rods. There have been four rod failures since start of injection of the inhibitor in July 1949, one of which occurred on August 1, 1949, probably before the protective film of inhibitor was complete. There have been no breaks since February 21, 1950. The cost of the treatment has been approximately $1 per day.

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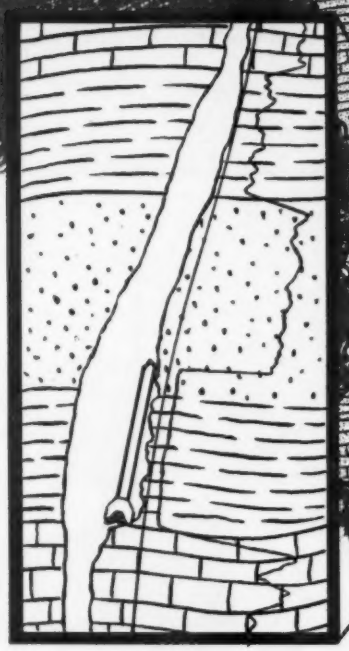

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Octane Numbers of Gasolines Hit Record Levels Last Summer

by O. C. Blade*

OCTANE numbers of motor gasolines sold in the United States increased to new record levels during the summer of 1950. The national average octane number of premium-price gasolines was 90.0 by the research method and 82.0 by the motor method. The national average octane number of regular-price motor-car fuels was 83.5 by the research method and 78.2 by the motor method. These values represent increases of one octane number since the preceding winter and of one and one-half to two octane numbers since the summer of 1949.

These tests on motor fuels are given in a survey report recently issued by the Bureau of Mines. The report includes results of tests of six other properties of motor fuels.

National average values are:

Gravity, 60.7° A.P.I. for premium-price and 60.6° A.P.I. for regular-price gasolines.

Corrosion, negative for all the samples tested.

Sulfur content, 0.079 per cent for the premium and 0.087 for the regular-price fuels.

Gum-test results, 2.4 mg. per 100 ml. for premium and 2.1 mg. per 100 ml. for regular-grade gasolines.

Tetraethyl lead contents, 2.36 ml. per gal. and 2.04 ml. per gal. for the two grades, respectively.

*Associate petroleum chemist, Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville, Okla. Summary of U.S.B.M. "R.I. 4765."

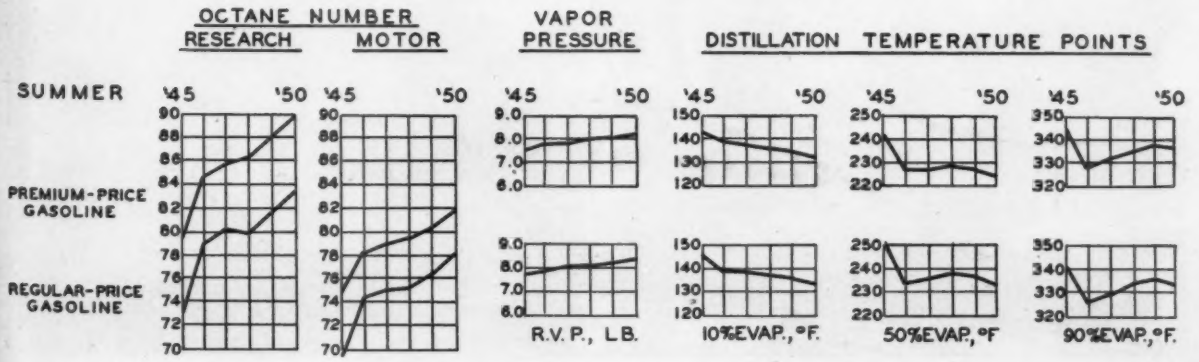
Country-Wide Sampling Program

A total of 2,859 samples from service stations in 212 cities throughout the country were collected and analyzed for this survey by company laboratories under a cooperative agreement between the Bureau of Mines and the American Petroleum Institute. The samples represent the products of 117 companies, large and small, who manufacture and supply motor gasoline.

The data have been compiled by groups according to 17 marketing areas (districts) into which the country is divided. The following tabulation shows the average research and motor-method octane numbers of regular-price and premium-price gasolines by districts.

District—	Research method		Motor method	
	Premium price	Regular price	Premium price	Regular price
1. **Northeast area:** Me., Mass., N. H., Vt., and northern N. Y.	92.2	86.5	82.4	80.1
2. **Mid-Atlantic Coast States:** R.I., Conn., N. J., Del., Md., Va., Central and southern N. Y., and eastern Pa.	92.1	86.3	82.0	80.0
3. **Southeast area:** N. C., S. C., Ga., Fla., Ala., and eastern Tenn.	91.2	85.8	82.5	80.1
4. **Appalachian area:** Ohio, W. Va., western N. Y., western Pa., eastern Ky., and a small portion of Md.	90.8	86.0	81.6	79.3
5. **Michigan**	90.4	85.5	81.9	79.2
6. **North Illinois area:** Northern Ind., northern Ill., eastern Iowa, and Wis.	89.2	83.6	82.2	77.7
7. **Central Mississippi area:** Western Ky., southern Ind., southern Ill., and eastern Mo.	89.4	83.1	81.9	77.9
8. **Lower Mississippi area:** Miss., La., eastern and southern Ark., and western Tenn.	90.6	84.1	82.6	79.5
9. **North Plains area:** Minn., N. D., and S. D.	88.5	81.9	82.2	77.6
10. **Central Plains area:** Neb., Central and western Iowa, northwestern Mo., and northern Kans.	88.4	82.4	81.6	77.5
11. **South Plains area:** Southern Kans., southwestern Mo., western Ark., Okla., and northern Tex.	89.2	81.9	81.2	77.6
12. **Southern Tex.**	88.9	83.8	83.5	80.7
13. **South Mountain States:** Southwestern Kans., Panhandles of Okla. and Tex., western Tex., N. M., Colo., Utah, Ariz., Nev., and eastern Calif.	88.2	80.1	81.1	75.6
14. **North Mountain States:** Wyo., Mont., Idaho, eastern Wash., and eastern Ore.	88.7	81.4	80.5	75.6
15. **Pacific Northwest:** Western Wash., and western Ore.	90.9	82.3	82.2	77.1
16. **Northern Calif.**	91.3	82.7	82.3	76.7
17. **Southern Calif.**	89.9	82.3	81.6	76.8
National average	90.0	83.5	82.0	78.2

	Summer	Octane number— Research	Motor	R.v.p. (lb.)	10% evap. (°F.)	50% evap. (°F.)	90% evap. (°F.)
Premium-price gasoline	1945	79.7	74.9	7.6	142	243	346
	1946	84.7	78.3	7.8	139	226	329
	1947	85.9	79.2	7.8	137	226	331
	1948	86.1	79.5	8.0	136	228	335
	1949	88.0	80.4	8.0	135	227	338
	1950	90.0	82.0	8.2	132	224	336
Regular-price gasoline	1945	73.3	69.7	7.7	145	251	351
	1946	79.3	74.4	7.8	139	233	336
	1947	80.2	75.1	8.0	139	235	339
	1948	80.1	75.2	8.0	138	238	343
	1949	81.9	76.4	8.1	137	237	345
	1950	83.5	78.2	8.3	134	232	341



DRILLING Operating Ideas . . .

Here are practical installations used by well-known drilling firms

Pump, Diesel and Fuel Tank Mounted on Common Frame

IN an endeavor to simplify its small-hole drilling rigs, Hooper Drilling Co., of Los Angeles, has mounted the mud pump, engine, and the fuel tank on a common skid-type base, in addition to the mud-distribution manifold. The base is made with three skid members having dragging cable connections and lifting slings, and cross braced so the pump and accessories will rest snugly without unnecessary movement.

Pump suction is obtained through a double flanged nipple, one end connected to the pump and the other extending to the edge of the frame where a rubber suction line is connected. The engine is installed behind with its subbase at right angles to the main skid members of the unit foundation. The tank is mounted as near the extreme end of the foundation as practicable, and in this position makes possible the installation of fuel-transfer lines in a permanent position without extra pipe or oilproof hose.

The mud manifold is constructed of a single straight length of pipe placed near the base of the pump and running parallel to the crank case. The discharge pipe is carried from the pump back over the crank case and gear housing in a smooth even bend where it is connected to a section of the mud manifold. The line carrying the mud to the rig standpipe is fitted with a large, heavy-duty hammer valve and a single bolt union so the line may be disconnected and removed easily.

A series of hammer valves are connected to the mud-line distribution manifold as closely to the line as practicable so that short nipples are required to extend each individual line to the edge of the unit foundation where they are extended to the point of use. Therefore, when tearing down a rig, the supplementary lines are easily disconnected and the main mud line removed by taking apart the single bolt union. The bolted flange on the suction is then separated. The remainder of the unit is kept in place ready to be loaded on a truck.

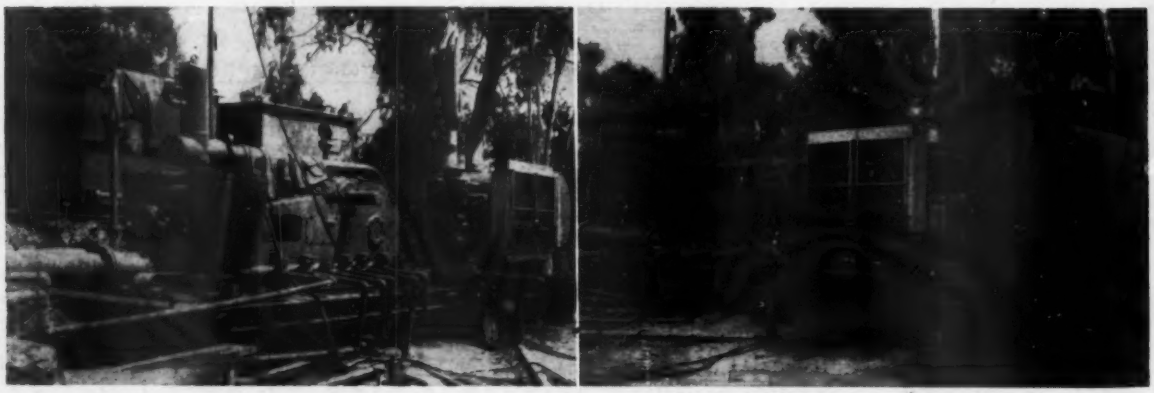
Here are three views of mud pump, engine, fuel tank, and mud manifold, all mounted on one frame.

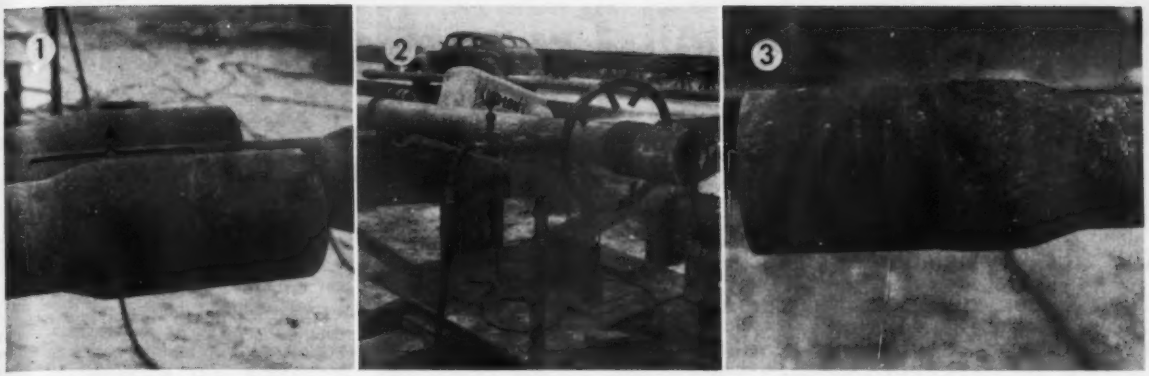
Reinforcing Tool Joints With Tungsten Carbide

DESTRUCTIVE wear of tool joints when drilling in abrasive formations may be reduced by welding tungsten carbide onto the surface of the tool joint, and into the shoulder formed by its juncture with the drill pipe. The tool joint and drill pipe are first cleaned thoroughly at the area where the protective material is to be applied.

The face of the tool joint is marked off into 90° sections. The body surface of the tool joint is usually divided into four cylindrical sections by marking. A power grinder is used to remove enough of the original metal at the shoulder so the subsequently applied weld bead will be approximately level with the original contour of the shoulder. Grinding is done to lower the face of the hard surfacing so as to prevent undue wear on elevators.

In the initial welding step the operator preheats the tool joint using a gas-fired ring heater. This heater is made from an endless pipe ring having eight equally spaced burner tips attached so the heat will be concentrated on the metal at the desired point. Fuel is supplied to the heating ring at one point, through a 1-in. line to which is fitted a control valve and a flexible





1. Section A marks joint area to be coated with tungsten carbide. 2. Circular gas burner maintains high heat. 3. Completed tool joint with hard, wear-resistant surface of tungsten carbide.

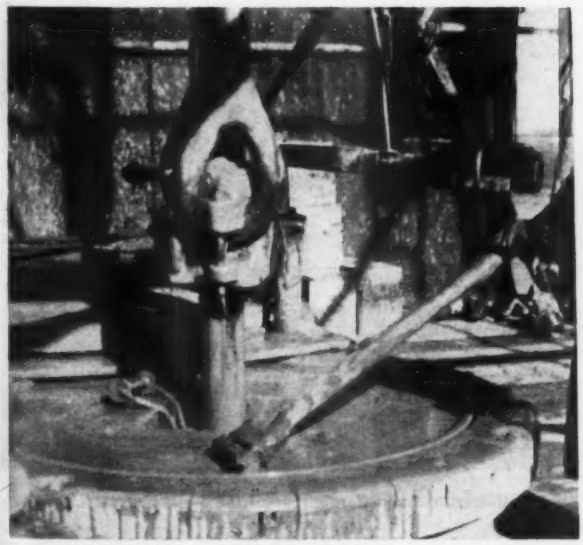
hose. The assembly is supported in a V-block attached to an adjustable standard having a crank-type set screw for locking at the required height.

As the tool-joint metal reaches the desired temperature, the welder starts by laying down in concentric rings a double bead of carbon steel. These beads are light and slightly separated. They serve as a binder or retainer for the tungsten carbide, since this hard-facing material adheres more readily to the carbon steel bead than to the tool-joint steel. The shallow depression between the adjacent carbon steel welded rings is filled with the hard-surfacing material and welding is continued until the four separate rings have been applied. Hard surfacing is then applied to the groundout shoulder reinforcing points and the entire surface again preheated. The welder changes to an acetylene torch with a tip designed for large-surface heating as a followup.

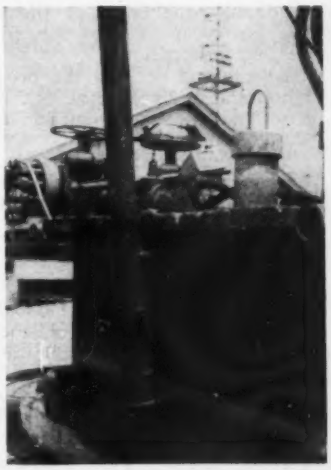
While the torch is being operated to soften the base metal the welder, or a helper, hammers the tungsten carbide bead into the retaining carbon steel beads until the entire surface of the tool joint is relatively smooth and free from burrs. The shoulder is treated in a similar manner so the traveling block elevators will not be damaged, or worn in spots, by the tungsten carbide surface.

Handy Rotary-Table Scraper

CLEANING the surface of the rotary table is not much of a chore when a rubber scraper is used to break away hardened mud not easily removed by water from the wash-down hose. The scraper is half of a pumping well "oil-saver" rubber, fastened to a handle somewhat resembling that of a lawn mower. The large end of the wood handle is shaped to fit the back of the rubber, which is attached with wood screws or nails.



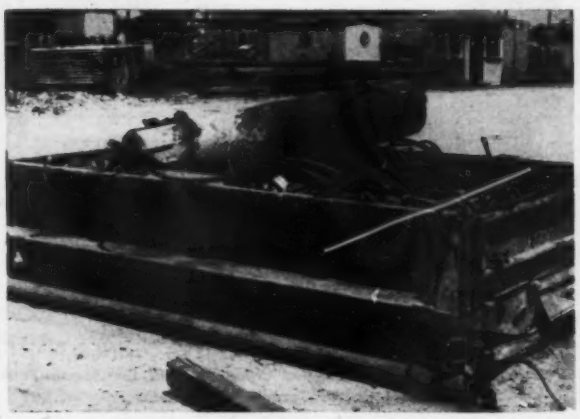
Post Holder



NO additional supports are needed for power-line posts when a socket to retain them is attached permanently to walkways or other structures. A piece of heavy pipe large enough to receive the lower end of the high-line post is used for the socket. Two brackets made of flat steel plate are welded to the end of the structure to provide adequate support for the socket. Matching holes are drilled through the post shank and the socket, and the post is secured with a large machine bolt.

Junk Box

A DISCARDED "bob-tail" dump truck body serves as an excellent junk box for a rotary rig. The box is supported on a rectangular frame made from 3-in. pipe so constructed that each end of the truck body rests on the frame. Bails of heavy rod are attached to the four corners of the frame and extend above the side rails so that the box can be lifted with a truck boom.



Royal Dutch-Shell Group Nearly Doubles Venezuelan Production Since 1945

This article by members of the technical staff of the Royal Dutch-Shell Group discusses that company's postwar progress in Venezuelan oil operations. Production at present is in excess of 480,000 bbl. daily, with 24 rigs drilling.

POSTWAR development of the oil fields of the Royal Dutch-Shell Group in Venezuela can best be characterized by comparing the daily crude-oil production at the end of the last year of the war with the present production.

At the end of 1945 the production amounted to 250,000 bbl. of crude per day. The present production exceeds 480,000 bbl.

To obtain this increase it was necessary to step up development considerably in the various fields, and the number of drilling strings in operation was therefore gradually increased from 15 to 24.

In the postwar years such an increase in activity could naturally not be achieved without surmounting great difficulties. Firstly the staff, which was seriously depleted during the war years, had to be restored to normal strength and was later on expanded considerably.

In the first years after the war this was indeed a very difficult task and it was not until the beginning of 1949 that this staff shortage was solved in a fairly satisfactory manner.

The same applied to the supply of materials. The very specialized requirements of the oil industry could only be filled with difficulty. Notwithstanding these and other serious handicaps the Royal Dutch-Shell Group succeeded in almost doubling its production in Venezuela, while at the same time the existing installations were modernized and enlarged considerably. This effort was possible only on account of the preparations which were already being made with this purpose in mind during the war years and was to a large extent also due to the energy and drive of the operational and supervisory staff in Venezuela, working in close contact and cooperation with the head offices in London, New York, and The Hague.

The crude oil which is produced by the Royal Dutch-Shell Group in Venezuela originates exclusively in the oil fields of the Maracaibo basin, situated on both the eastern and western sides of Lake Maracaibo in the western part of Venezuela.

To obtain an idea of how each of these fields contributed to the postwar expansion, the production of these fields in 1945 and at present is tabulated as follows:

Field—	Crude-oil production in barrels per day: End 1945	July-Aug. 1950
Cabimas	18,000	13,100
Tia Juana	35,300	54,000
Lagunillas	72,700	56,000
Pueblo Viejo	3,500	700
Bachaquero	32,000	81,000
Mene Grande	35,900	46,200
Los Manueles	4,800)	
Las Cruces	12,300)	8,600
West Tarra	.....	4,000
La Concepcion	3,400	3,900
La Paz	27,000	165,000
Mara	6,000	37,000
Sibucara	.....	10,600

It will be seen from this comparison that Cabimas, Lagunillas, Pueblo Viejo, Los Manueles, and Las Cruces fields have decreased in production. These fields belong to the group of older fields which were already very largely drilled up before the end of the war. Activity in these fields during the postwar period consisted, therefore, mainly of production and maintenance work to keep in operation the numerous beam-pumping outfits by means of which most of the oil is lifted in these fields.

The most noticeable increase in production took place in La Paz field. In this field, which formerly produced from the Eocene and younger sands, a very important limestone reservoir was discovered in 1944 in the underlying Cretaceous.

Up to January 1, 1950, a total of 26 wells had been completed in this limestone reservoir from which 137,000,000 bbl. of oil have been obtained,

View of the main administration office of Shell Caribbean Petroleum Co. at Caracas, Venezuela.

New building at Punta Cardon site of the Shell Group's new Venezuelan refinery.

and at that date 16 wells were producing at a rate of about 147,000 bbl. per day. In comparison, a total of 83 wells have produced some 18,000,000 bbl. of oil since 1922 from the higher Eocene formations. These figures illustrate clearly to what extent the Cretaceous accumulation overshadows in importance the older shallow field.

The Cretaceous reservoir consists of a 1,800-ft. thick layer of tight, impure limestone which is oil bearing over an area of more than 22,000 acres. The limestone has low porosity and permeability. Tetonic movements have, however, fractured this limestone in such a way that the oil which is contained in its pores can be recovered, while the resulting fractures, fissures, and hair cracks make excellent communication possible through the major part of the reservoir. The spectacular productions of some La Paz wells, of which a few have proved capable of producing more than 30,000 bbl. per day, are thus made possible.

Production performance and the behavior of the reservoir pressure have shown that the production mechanism consists of the expansion due to the reduction of the reservoir pressure of the oil and its associated solution gas originally present in the reservoir. The amount of gas produced with the oil is practically the same as the quantity of gas originally in solution in the oil produced.

Total gas production of the field is, however, still considerable and it is, therefore, worth while to extract the light products from these gases. For this purpose a modern gasoline-absorption plant has been constructed in La Paz and is now on stream. This plant will be an addition to a small reconditioned installation, which has been operating since 1948.

During the development of this very important reservoir the necessity of applying scientific production methods became very apparent. This task is now performed by the reservoir engineering section which has been attached to the technical management. This section studies the behavior of the Venezuelan oil reservoirs and gives the advice necessary for the most efficient and economic development of the oil accumulations.

Up to 1948 drilling in La Paz was mainly carried out with medium-heavy and heavy steam drilling rigs. Now these steam rigs have completely been replaced by modern power rigs. Wells in La Paz reach a final depth between 8,000 and 10,000 ft. During the last years the drilling time of these wells has been reduced by half, which has been achieved largely owing to the experience gained with the increased drilling activity in the area. Another important contribution to faster drilling was the introduction of oil-emulsion drilling fluid. This fluid has excellent formation-preserving properties and reduces the occurrence of cavings which used to cause considerable delay in this field due to the frequent sticking of the drilling tools.

Another limestone field developed in the postwar period is Mara field situated to the northeast of La Paz on the same anticlinal trend. The same limestone is productive in this field from similar depths to those in La Paz field. The production mechanism is identical to that described for La Paz. The limestone, however, is not so highly fractured as is the case in La Paz, so that several independent reservoirs can be recognized.

Mara field extends outside the concessions held by the Royal Dutch-Shell Group and the accumulation is shared with three other oil companies. From the start of operations these companies decided, however, to develop the field in a rational manner and some arrangements were made, the most important of which is the Mara operating agreement. In this agreement a location grid was laid down in order to prevent the drilling of unnecessary offset wells, and a production operating code was prepared designed to conserve the gas energy of the oil-bearing reservoirs. Shell was appointed as operator of Mara pool. This agreement is still in force and has proved to be beneficial to all. Also in Mara, a gasoline-absorption plant is under construction

Great Interest Aroused

The success achieved in La Paz and Mara fields has naturally aroused great interest in this Cretaceous limestone in general. Therefore, practically all exploration activities in the postwar period were directed towards the investigation of this limestone on the known structures of the Maracaibo basin. These efforts have been partly successful, as the limestone was found productive on three other structures, viz: West Tarra, La Concepcion, and Sibucara, although in the latter two areas at considerably greater depth.

The limestone fields discussed so far are all situated west of Lake Maracaibo. Under the lake and also on the eastern shore the limestone has been explored. In the lake the formation was found to be waterbearing, while on the east shore the limestone proved to be within reach of the drill, so far in only one locality. The mechanical condition of the hole prevented, however, a satisfactory test of the formation content.

Two other important fields which were extended considerably are Tia Juana and Bachaquero. These fields are situated along the eastern shore of Lake Maracaibo and produce from the Miocene, which is oil bearing in synclinal basins situated between the Eocene extensions of the more eastern mountain chains.

Oil reservoirs in these fields consist of a loose, thick and irregularly deposited sand series which occurs at depths of between 1,000 and 4,500 ft. The oil fields extend over large areas and are drilled up with a spacing of 11 or 34 acres per well, depending on the net thickness of the oil-bearing sands.

More than 250 wells have been drilled in Tia Juana since the end of 1945, and over 450 in Bachaquero. These fields are by no means drilled up, and the limits of the productive area have not yet been established in all directions. In both fields, therefore, appraisal and outstep drilling is still in progress.

Mene Grande field, which is one of the older fields of the Royal Dutch-Shell Group in Venezuela, was gradually further developed during the postwar years. Sizable extensions have been found which made a substantial increase in production possible. Now, however, the limits of the field appear to have been reached and a gradual decrease of the production in the future must be expected.

The Colon district fields are situated to the southwest of Lake Maracaibo in the vicinity of the Colombian - Venezuelan frontier. Activity here consisted mainly of exploration and appraisal drilling in the newly discovered West Tarra field where the Cretaceous formation, although developed in a less favorable facies, yielded a good quality of crude oil. Production results have so far been mediocre, however.

During the past year the Royal Dutch-Shell Group also started exploring its concessions which are situated in Lake Maracaibo itself. As the water depth in these concessions varies between 60 and 90 ft., and the lake bottom consists of a considerable depth of soft muds, a particularly unusual foundation problem for the drilling of wells had to be solved. After lengthy specialized study, a suitable type of foundation was developed, and at present three wells have been drilled in the lake using this new method.

The discussed extensions to the producing fields and the increase in the daily offtake also naturally caused a large amount of construction activity outside these fields.

In the Mara - Maracaibo district, which comprises La Paz, Mara, La Concepcion, and Sibucara fields, a completely new pipe-line system and a modern shipping terminal were constructed. A new road system was also built in this district, while extensive measures had to be taken to insure a sufficient supply of water.

The increase in staff in the postwar period caused a considerable increase in the building of houses. With material gradually becoming available, housing accommodation for the large Venezuelan staff was considerably improved, and at present the Royal Dutch-Shell Group can justly be proud of the model camps where its workers are housed and which are complete with schools, churches, recreation halls, shopping centers, hospitals or dispensaries, and sports grounds.

Fig. 1

Fig. 2

Fig. 3

Cableless Electronic Bottom-Hole Pressure Measurement

used in German oil wells

by C. H. Biedendieck*

INITIAL tests of cableless bottom-hole-pressure measurement equipment developed in Germany were conducted successfully in May 1950 on a pumping well in an oil field located in the Emsland area of Germany. This newly developed equipment is installed for permanent use. Measurements of bottom-hole pressures have been continued to date in this installation.

The principle of operation of this system involves transformation of pressure into oscillations of varying frequencies for transmission to a remotely located electronic indicating device. Changes in tension of a swinging wire produce frequency changes varying in accordance with changes in bottom-hole pressure. Due to the permanent nature of the installation a convenient and ready means of obtaining bottom-hole pressure is provided. Collection of pressure data is facilitated for making necessary calculations with regard to regulation of gas lift and pumping systems in the oil field.

Since precise bottom-hole-pressure measurements are the basis for calculations of reservoir pressure, material-balance estimates, productivity index, etc., particular attention has been paid to development and calibration of instruments for this purpose. Several types of conventional mechanical deep-well pressure-recording instruments have been developed and are in use. (At least one electrical system has also been developed). Use of the conventional short-time recording bomb, however, means costly nonpermanent installation each time bottom-hole pressure must be measured, and interruption of production in many cases, as well as extra cost involved in careful calibration of the instrument.

*Bentheim 23, Germany.

Construction of Device

The new measuring device consists of a pressure bomb (Fig. 1) at the tubing shoe and the indicating apparatus (Fig. 2) at the surface. The pressure at the bottom of the well is transformed in the bomb into frequencies which are carried to the indicator. Here the frequencies are made visible by a cathode-ray tube (Lissajous' figure). On the same screen of the cathodic ray tube the frequency of a second frequency system is made visible. The second frequency may be varied and tuned to the frequency from the pressure bomb by the operator. This process, which may be actuated even by an unskilled operator, requires only about 3 seconds.

For transmission of frequencies from the pressure bomb to the indicating apparatus a two-core cable (wire cross-section of 0.75 sq. mm.) is required. However, to avoid the many difficulties resulting from use of an insulated cable in pumping wells, tubing and casing are isolated from each other and used as transmitting systems. The pressure bomb is then enclosed in a shell with three contact springs screwed on the shoe of the tubing (Figs. 3 and 4). Isolation of tubing from casing was obtained by the use of roughly constructed wooden protectors. Casing and landing flanges were isolated by an oilproof buna-rubber plate. Screws and rod hangers may be isolated by plastics or kraft paper. The measuring currents of low voltage require only small isolating effects.

Diameter of the pressure bomb is less than the inside diameter of 2½-in. tubing. Therefore, it is also possible to insert the pressure bomb in flowing wells with cable. But the cableless design is more economical as the cost of isolating the tubing will generally not exceed that of a system with an isolated cable. In wells with high water level an isolated cable is required, at least up to the water level. Water-in-oil emulsion in not too high a degree will not affect the cableless indication.

Errors Avoided

By using frequency modulation in amplification of the measuring current, error due to variation of resistance in the transmission system is avoided. Therefore the indicating apparatus need not be located at the well head but may be set up at the supervision center of the field, using the telephone system as a communication device. The influence of temperature changes in the well in their effect on the frequency in the pressure bomb is eliminated through special design. The accuracy of the system amounts to a maximum error in indication of within ±0.2 per cent referred to the maximum pressure. At present bombs have been constructed for pressure ranges of 50, 100, 200, and 300 atm. Temperature measurements can be made utilizing the same principle. The temperature-measuring bomb has an over-all length of only 80 mm. and a diameter of 20 mm.

With permanent installation made possible by this type of electronic system, bottom-hole pressure may be obtained simply and conveniently at any desired time. The time intervals will be fixed by the production engineer in accordance with the specific flowing conditions of the well. Pressures may be taken without interrupting the flow of oil or gas. Bottom-hole measurements with conventional short-time recording bombs interrupt production and are a costly service, particularly on pumping wells.

(Continued on page 107)

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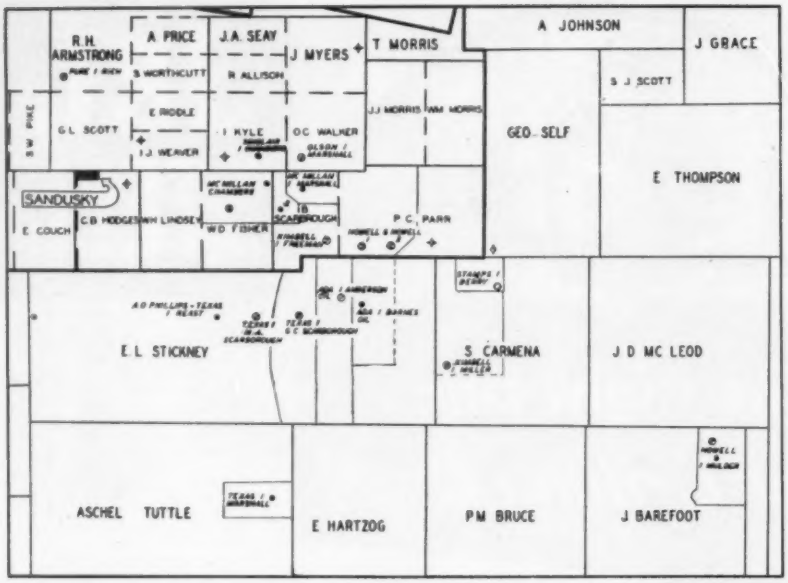


Map showing location of completed and drilling wells in Sandusky field. Major subdivisions are surveys.

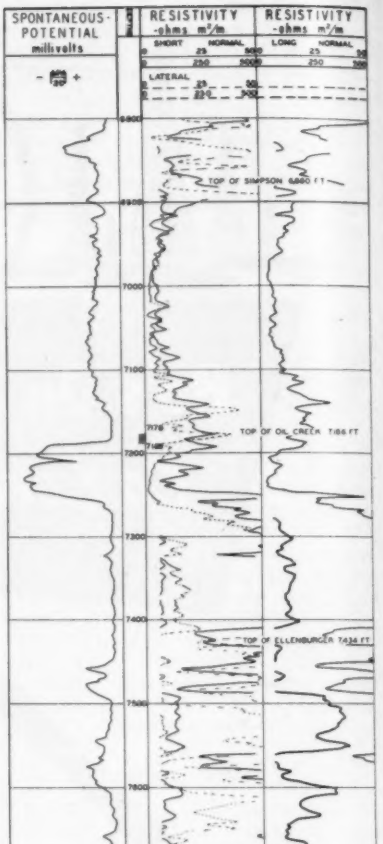
Good Drilling-Activity Potential at Sandusky, Grayson County, Texas

by Carl Hoot
Dallas District Editor

DISCOVERY of Ellenburger production in northwest Grayson County, Texas, set off a drilling campaign that has since found both Simpson and Pennsylvanian oil in the immediate area. Seven producers and four dry holes have been completed. There are 11 active drilling operations in the area, 1 of which indicates a major Ellenburger extension or a new pool discovery.

Initial discovery.—Discovery well of Sandusky field was The Texas Co. 1 John Marshall, Aschel Tuttle Survey, about 2 miles southeast of Sandusky townsite. This well logged the Simpson at 6,668 ft., the Oil Creek at 7,290 ft., and the Ellenburger at 7,543 ft. It was completed during January 1950 in the Ellenburger flowing 106 bbl. of 44°-gravity oil a day through a 12/64-in. choke. This well has not been offset to date.

Oil Creek discovered.—In July 1950 L. O. McMillan completed his 1 Chambers, W. D. Fisher Survey, about ½ mile east of Sandusky townsite, as the discovery well of Sandusky-Oil Creek pool. This well, which had a good show of oil in the Pennsylvanian, was completed in the Oil Creek. It flowed 396 bbl. of 43°-gravity oil a day through 3/16-in. choke from perforations at 7,178-89 ft. McMillan 2



Electric log of L. O. McMillan 1 Chambers, Oil Creek discovery well in Sandusky field. Mud resistivity 1.6 at 71° F. and 0.78 at 148°F., bottom-hole temperature. Spacings: AM 16 in., AM' 64 in., and AO 15 ft.

Drilling Data for Sandusky Field

FIELD LOCATION.—The town of Sandusky is on State Highway 10, between Whitesboro and Gordonville. Sandusky itself is not shown on most maps. It lies 13 miles due west of Pottsboro but is reached from that direction via Whitesboro.

DRILLING PRACTICES AND CONDITIONS.—Drilling is with rock bits all the way. Operators have reported no serious difficulties. With the exception of Sinclair 1 Chambers, there have been no excessive gas pressures.

Water supply for drilling is plentiful, from creeks, or from fresh water veins at about 200 ft. depth.

Drilling rigs are medium-duty, and divided about equally as between conventional and jackknife type.

Field rules have not yet been set by Texas Railroad Commission. Surface casing on the discovery well in the Oil Creek was set at 1,375 ft., and oil string was set to top of pay section. Water table in the discovery was —6,455 ft.

Average drilling time to the Oil Creek is 45 days, using about 45 rock bits. A round-figure cost per well has been estimated at $100,000, without tankage.

CONTRACTORS.—McMillan, and Howell & Howell are using company tools; Dillard & Waltermire Drilling Co. is operating for The Texas Co. and Ada Oil Co., and Jack Grace is drilling for Sinclair.

DATA ON COMPLETED WELLS IN SANDUSKY AREA

Well and survey—	Elev. (ft.)	Formation tops: Penn.	Simpson	Oil Creek	Ellen.	Completion
Texas Co. 1 Marshall, Tuttle	703	.....	6,668	7,290	7,543	Ellen. 7,856-61 ft., IP 106 bbl.
McMillan 1 Chambers, Fisher	753	.....	6,880	7,186	7,434	Oil Creek, 7,178-89 ft., IP 396 bbl.
McMillan 2 Chambers, Scarbrough	...	.....	.....	.....	.....	Oil Creek 7,174-78 ft.
McMillan 1 Thorn, Kyle	742	1,540	6,940	7,270	7,548	Dry, TD 7,839 ft.
McMillan 1 Greer	...	.....	.....	.....	.....	Dry, TD 7,495 ft.
Ada Oil 1 Barnes, Stickney	740	.....	6,907	7,148	7,390	Oil Creek, 7,160-66 ft., IP 364 bbl.
A. O. Phillips 1 Reast, Stickney	724	.....	.....	.....	7,754	Ellen., 7,740-7,852 ft., IP 187 bbl.
Pure 1 Q. Little, Myers	652	.....	.....	.....	.....	Dry, TD 9,919 ft. in dolomite.
Sinclair 1 Chambers, Kyle	739	.....	.....	7,160	.....	Oil Creek, 7,183-87 ft., IP 541 bbl.
Texas Co. 1 Winchester, Hodges	763	.....	.....	.....	7,565	Dry, TD 9,520 ft.
McMillan 1 Marshall, Scarbrough	729	.....	6,950	7,234	.....	Penn., 6,854-64 ft., IP 56 bbl.

Chambers, a southeast offset to the discovery well, was completed flowing from the Oil Creek at 7,174-78 ft.

Dornick Hills opened.—It was the east offset to McMillan 1 Chambers that was credited with the Pennsylvanian pool at Sandusky. McMillan 1 A. F. Marshall was dry in the Oil Creek and plugged back to the Dornick Hills (Pennsylvanian) where it was completed as a pumper. At last report the well's production of black, 28°-gravity oil was down from its initial potential of 56 bbl. per day to around 25 bbl. At least part of this decrease is believed to be mechanical.

Additional wells.—Sinclair Oil & Gas Co. 1 Chambers, north offset to the Oil Creek discovery, found 62°-gravity oil in the Oil Creek sand at approximately the same level as the discovery. On completion potential this well flowed 180 bbl. of oil in 8 hours through a ⅜-in. choke. Gas-oil ratio was high and flowing pressures presented a problem of keeping connections from freezing.

The northwest offset to the Oil Creek discovery well, McMillan 1 Thorn, was dry in both the Pennsylvanian and the Oil Creek sands.

Following close on the Oil Creek discovery, A. O. Phillips and The Texas Co. completed their 1 Reast as an Ellenburger well, making 187 bbl. of 42°-gravity oil a day through ¼-in. choke. Gas-oil ratio was 1,200 cu. ft. Location is about 1 mile southeast of Sandusky and the same distance south, and slightly west of McMillan 1 Chambers.

Just east of Sandusky and ¾ mile west of the Oil Creek discovery, The Texas Co. drilled its 1 Winchester to 9,520 ft. It was dry in all horizons. Approximately 2,000 ft. of Ellenburger formation were logged in this well.

In November, Ada Oil Co. (A. O. Phillips and The Texas Co.) completed their 1 Minnie Barnes as a 1-mile southeast extension to the Oil Creek discovery. Completion potential was 364.32 bbl. of 41°-gravity oil in 11 hours through 12/64-in. choke. The well was later reported making water but oil production was not affected.

One mile northeast of McMillan 1 Chambers, Pure Oil Co. drilled to 9,919 ft. The hole was dry in all horizons.

Drilling wells.—Pure's northwest outpost, 1 O. B. Rich, Armstrong Survey, was drilling below 7,475 ft. at last report. Sample top on the Simpson at 7,245 ft. was said to be low, although sand with oil shows was drilled from 7,258-66 ft., and a drill-stem test recovered 455 ft. of heavily oil and gas-cut mud in 1 hour.

Texas Co. 1 M. A. Scarborough, south of the Oil Creek discovery and between Ellenburger production to the west and Oil Creek production on the east, was nearing completion from the Oil Creek. A test from 7,164-72 ft. had water, but after plugging at 7,145 ft. the well flowed 248 bbl. of oil in 13 hours through ¼-in. choke.

Almost 2½ miles due east of the original Ellenburger discovery, Howell & Howell 1 J. C. Mulder, J. Barefoot Survey, was expected to make a separate Ellenburger discovery. The well recovered some oil-cut mud from the Pennsylvanian at 6,920-34 ft.; was drilled to 7,888 ft., then plugged back to 7,665 ft. There was no Oil Creek section present. A 1-hour test of the Ellenburger at 7,588-7,600 ft. had gas in 5 minutes and flowing oil in 15 minutes. No estimate was made of the output, but recovery was 1,250 ft. of 38°-gravity oil.

Electronic Bottom-Hole Pressure Measurement

(Continued from page 104)

Elimination of these objectionable features makes the frequency system described here especially suitable in supervision of pressures in all wells from the time production is started through the economic life of the well. The production engineer can now obtain a complete record of pressures in the first stage of production to aid him in making the best use of natural formation pressure in accordance with modern engineering practice. In secondary-recovery operations control of pressure distribution through the oil field is of no less interest. An exact pressure-flow curve furnishes the best interpretation of the existing oil-flow conditions.

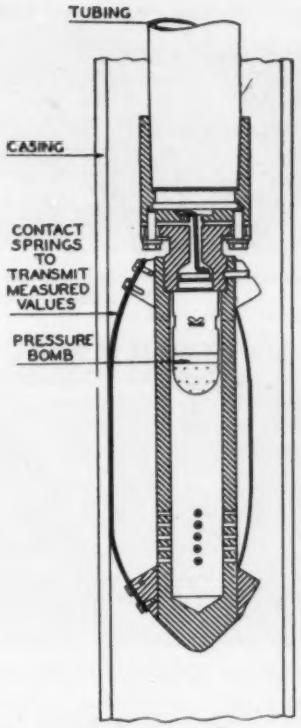


Fig. 4

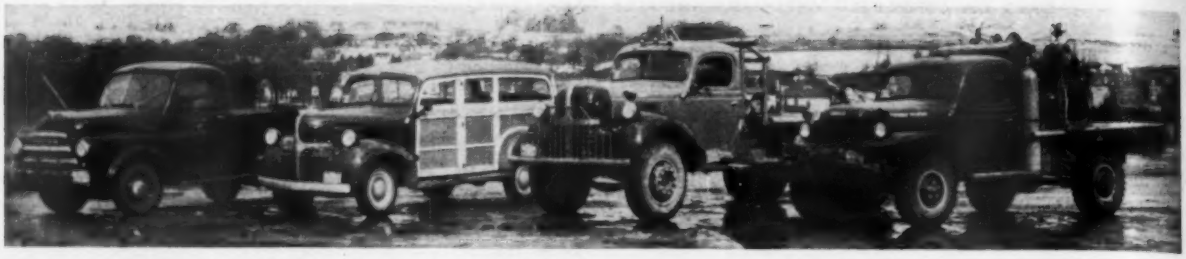
For intermittent gas-lift or pumping systems there is now available an indicating instrument for efficient rationing of intervals. The timing cycle is an important factor in obtaining maximum efficiency and minimum gas-oil ratios.

The high-quality bottom-hole-pressure instrument described here was developed, in collaboration with the author, by the German firm Maihak, manufacturers of industrial and laboratory measuring equipment. It is expected that this application will be further developed and that additional installations will be made, leading toward valuable experience in obtaining bottom-hole pressures.

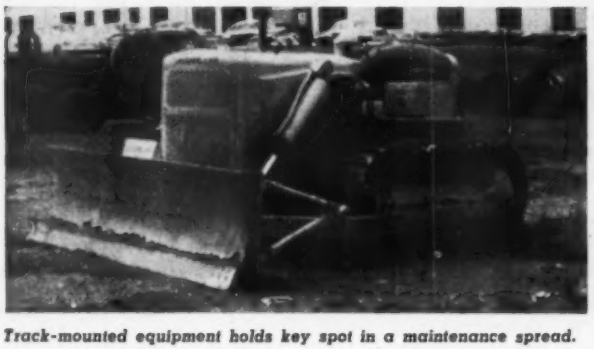
BOOKS

WHITE MINERAL OIL AND PETROLATUM. By Dr. Elrich Meyer. Published by Chemical Publishing Co., 26 Court Street, Brooklyn. 135 pp. $4.75.

This little volume fills a needed gap in the technical literature and should be a useful aid to the chemist, engineer, manufacturer, student, and all users of white mineral oil and petrolatum. In spite of the widespread use of the products, very little information regarding their chemical and physical characteristics and their uses is found in today's text books and handbooks of chemistry or medicine. The data and information presented are based on industrial research, and on laboratory and factory experience. The ingredients and nature of crude oil, its refining by chemical treatment, the quality standards of white mineral oil and petrolatum and their manufacturing process are discussed in detail.



Maintenance operations are run at top efficiency with the aid of these personnel and equipment carriers. Left to right: Half-ton pickup, station wagon of ½-ton chassis, 2½-ton maintenance truck, and utility welding truck.



Track-mounted equipment holds key spot in a maintenance spread.

Air-borne personnel carriers contribute to efficient maintenance.

Ideas in mobile pipe-line

Transportation and Maintenance Equipment

by T. L. Opie*

MOBILE transportation and maintenance equipment can be grouped under three headings, namely, rubber-mounted, track-mounted, and air-borne. The further generalization can be made that the first and third classes are usually gasoline-engine driven and the second usually diesel-engine driven. In the first category belong the various types of trucks, tractors, and personnal carriers.

Size of the pickup varies with choice of the operator. Although our ½-ton pickup is standard in appearance, the floor and front end of the body have been reinforced with 2-in. oak to take the concentrated weight of heavy valves, meters, etc. Various types of cabinets may be built into the rear for use of specialized mechanics.

While the personnel carrier has an important place in our operations, the wooden-bodied station wagon has been replaced entirely with steel-bodied vehicles. Two types are used. One, a light type, is mounted on a passenger-car chassis bearing passenger-car tags. This last point is important because of the many miles of parkway in New York and New England on which commercial vehicles are barred. In the event of an emergency, about 2 hours are saved between New York and Portland, Me., by using the parkways. These light personnel carriers are used by the general maintenance gang, the survey party, and by each of the different division mechanics who carry a full set of tools.

The heavier type is, in effect, a ½-ton panel-bodied truck with windows and seats and is used by the division maintenance gang, all district maintenance gangs, and the corrosion survey parties. We find that it is advisable to equip both types with extra spring leaves or booster springs when used for carrying any considerable amount of equipment. Several of these vehicles are equipped with two-way radios for intercommunication and communication with the maintenance foreman, whose car is similarly equipped.

The 2½-ton heavy-duty maintenance truck is equipped with winch, gin poles, "headache" rack, and tool boxes. Details of these trucks vary as widely as the ideas of individual operators. These bodies, complete with the gin poles and rack, and known as oil-field bodies, are available commercially, but like many other pipe liners, we prefer to build our own, receiving only the chassis and cab from the vendor. The two-speed rear axle is preferred, and the largest oversize heavy-duty tires available are usually specified.

Almost every size of truck, 1½ to 5-ton, is used, and 1½ and 2-ton are probably the most popular sizes. Occasionally these trucks are seen with the cab over engine and at least one in use by an eastern company has the seven-man cab that is popular with the telephone companies. The flat-bed body is usually built onto a truck with a wheel base of approximately 160 in. because of the shorter turning radius and greater maneuverability, but we have been using the next size, about 176 in. in length, in the last 3 years or so and prefer them because of the larger load-carrying platform. These trucks are fitted with removable sides and ends when used to carry valves, fittings, small portable equipment, such as light plants, product and water pumps, tapping machines, pipe cutters, etc. Load capacity of a truck like this is about 12,000 lb.

The winch on this truck has a ca-

(Continued on page 110)

*Socony-Vacuum Oil Co., Inc. Summary of paper given at American Petroleum Institute, Division of Transportation Products Pipe Line Technology Conference, St. Louis.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Proper Price for Straightrun Residuum

Could we have a discussion on the refinery cost accounting for fixing the price of straightrun resid and cracked resid? There does not seem to be any general agreement on this subject. In some cases a resid is assessed a crude charge (proportion by volume of resid), plus handling charges for crude delivery, plus refining processing costs (on proportional volume) all the way through the refinery—thus giving an excessively high resid "manufacturing cost." In other cases, the same scheme is followed except that the crude assessment is lowered to some arbitrary figure such as 25 per cent of crude price—which seems quite artificial. Still another way is to balance out the cost of crude per barrel entirely by the liquid products above resid in volatility—giving for practical purposes nearly a zero manufacturing cost for resid. Finally, the quoted selling price of No. 6 fuel oil is sometimes taken as equal to the manufacturing cost, which means that the cost of processing straightrun into cracked resid is just equal to the value of the light products so produced. Your discussion and comments will certainly be appreciated. Can you suggest a good refinery cost-accounting text?—C. C. A.

In any byproduct industry there are many ways to figure or estimate the value of a product, meaning that the over-all price received for a barrel worth of products is dependent not on the value of any one product but upon the various values of the several products. Thus, one operator may for special reasons, receive his income from certain products, whereas another operator may make his income from others. This leads to the general conclusion that the prices being quoted on a free and competitive market are close to the true or proper values of each of the products. If this were not true, it would mean that refiners are so inept that they do not recognize a profit or a good price when they see it.

This conclusion is based on the assumption that quoted prices are true values if only enough bidders and sellers enter the market. However, such a conclusion is valid only for those smaller operators whose production is not large enough to "set" or even seriously disturb market quotations. Really large refiners cannot rely upon market quotations because they are the ones who set or fix the market price by being the only operators that are able to satisfy large portions of the market demand. Nor can these large producers charge, over any prolonged period of time, an excessive or artificial price because enterprising small operators will be able to underbid. Thus, in the long run, the major producers find that they are responsible for the market price but that their price is equal to their raw material plus gathering, refining, and dispersing costs, plus a reasonable profit. There are, of course, many extenuating circumstances, but as an average applied to large operators and over long lengths of time, the general thesis stated above is true. All of this preamble is merely for the purpose of stating that quoted market prices tend in a free and competitive market to be proper and true values.

Working from the market prices of products, the value of residuum can be set up in two different ways:

1. Its value is equal to the income received for the cracked products derived from it, less operating costs incurred in processing it, and less a modest profit.

2. Its value is the cost of crude oil plus the cost of topping or reducing the crude oil to residuum, less the income derived from the products other than residuum. The income from the topping-still products already includes profit as a part of their quoted prices and hence no profit should be included unless perhaps a small profit based on the sales price of the residuum.

The trouble with either of these two methods is the difficulty encountered in precisely stating the yields or operating costs. Process engineers, superintendents, or technical men might be able to state yields and costs for a specific operation but to state such figures for all possible operating conditions would be difficult or too complicated for accountancy purposes. Even if yields and operating costs are settled upon, both of the methods involve several arithmetical operations and are therefore not entirely convenient for refinery accounting. This probably accounts for the several rule-of-thumb methods suggested in the statement of the question. Finally Method 2 is not as satisfactory as Method 1 because it includes the price of crude oil. Crude-oil prices are generally correct and of course are related to the market prices of products, but the 2-cent differential in price per 1° A.P.I., now used so widely, is seldom exactly correct. When the price of Bunker C is relatively high as in 1948, the dif-

TABLE 1—PRICES AS OF MARCH 1950

	$ per bbl.
39° A.P.I. crude oil	$2.72
32° A.P.I. crude oil	2.60
26° A.P.I. crude oil	2.24
18° A.P.I. crude oil	2.20
Gasoline—cracked	4.02
Gasoline—straightrun (inferior)	3.80
No. 1 distillate (very light)	3.00
No. 2 distillate	2.80
Bunker C	1.50
Loss (fuel-gas equivalent)	*2.16

*For cracking loss, but only 84 cents for topping loss.

TABLE 2—VALUE OF RESIDUUM AS A CRACKING STOCK

	Per cent	Value
Unaccounted for	4.5	$1.63
Cracked gasoline	40.5	.10
Bunker C	55.0	.82
		$2.55
*Operating cost	$0.35	
Profit	.20	
Costs		0.55
Value of residuum at Houston		$2.00

TABLE 3—VALUES OF RESIDUUM BASED ON CRUDE-OIL PRICES

	39° A.P.I. crude oil				32.5° A.P.I. crude oil				26° A.P.I. crude oil			
	%	A.P.I.	Values		%	A.P.I.	Values		%	A.P.I.	Values	
Topping loss	1.3	....	$0.01		1.0	....	$0.01		0.5	....	$0.00	
Gasoline, S.R.	37.2	56.7	1.41		28.5	56.0	1.08		19.0	55.5	0.72	
No. 1 distillate	....	....	....		26.0	35.0	.76		10.5	38.0	0.32	
No. 2 distillate	43.0	33.0	1.20									
Residuum	18.5	17.8	....		44.5	17.7	....		70.0	17.6	....	
Crude oil	100.0	39.0	....	$2.72	100.0	32.5	....	$2.60	100.0	26.0	....	$2.24
Operation				.20				.21				.23
Costs				$2.92				$2.81				$2.47
Topping products			$2.62	2.62			$1.85	1.85			$1.04	1.04
Value of resid				$0.30				$0.96				$1.43
Price of resid, $/bbl.	0.30 ÷ 0.185 = $1.62				0.96 ÷ 0.435 = $2.16				1.43 ÷ 0.70 = $2.04			

ferential in price per degree should be less—meaning that low-gravity crude oils are underpriced in relation to high-gravity crude oils. The reverse situation occurred in 1949. Thus, Method 2 would give different results when applied to two crude oils of greatly different gravity.

The two methods were checked for prices of March 1950 based on Houston cargo lots and delivering West Texas crude oil to Houston. At this date, the proper differential per degree A.P.I. was about 2 cents or about the same as the differential used in posting prices of crude oil at the well. Crude oils of 39°, 32°, and 26° A.P.I. were considered, which is somewhat hypothetical because 26° A.P.I. crude oils are not common in West Texas. The prices, including 24 cents for gathering and transporting the crude oils, are shown in Table 1.

By Method 1, cracking an 18° A.P.I. residuum to an 8° A.P.I. Bunker C fuel, the value of the residuum is $2 as shown in Table 2.

As might be expected, Method 2 gives three different values for the residuum as shown in Table 3. The results are not even consistent, and it is presumed that the inconsistency is due to errors in estimating yields and gravities rather than fault in the crude prices. Note that the price of an 18° A.P.I. crude oil, by extrapolation of the West Texas crude schedule, is $2.20. The same computations based on another crude oil such as East Texas gives even different and higher values (even $2.20 for a 39° A.P.I. East Texas crude).

In summary, it would seem that the most accurate and a reasonably simple method is to compute the value by Method 1 namely, its value in terms of the cracked products that can be made from it, less the operating costs and a profit. The second method which involves the posted price of crude oil is inferior because crude-oil postings are not directly the result of a free and competitive market as are product prices, and particularly because the 2-cent differential seldom indicates the true relationship between crude oils of different gravity. The posted price of crude oil of the same gravity as the residuum is not a bad approximation of the value of the residuum except that it will usually be slightly high, but can also be too low when the market price of Bunker C fuel oil is relatively high. Of course, such a method is not very dependable in the gravity range of 18° or lower.

There are, of course, reasons for selling an 18° A.P.I. residuum for lower prices than the above, notably the lack in most refineries of extra capacity for handling such a low-gravity stock.

Cost-accounting textbooks do not seem to undertake such problems and no suitable books appear to be available.

Transportation and Maintenance Equipment

(Continued from page 108)

pacity of 15,000 lb. and is driven from a power takeoff from the drive shaft. Utilizing the winch and gin poles, we can set a 12-in. valve with this truck, whereas an 8-in. valve is just about the limit of a 1½-ton truck with similar equipment.

Our utility welding truck is four-wheel drive. Delivered to us originally with a pickup body and 7,500-lb. front-end winch during the truck shortage immediately after the war, we found its usefulness somewhat limited. We removed the pickup body, installed a second winch with a capacity of 12,000 lb. in back of the cab, mounted an electric welding generator over the winch, and built a flat bed with gin poles and boxes for welding rod and small tools.

With the addition of acetylene and oxygen bottles, cable and hose, torches, beveling machine, and miscellaneous tools our welder is able to reach more than 95 per cent of our system fully equipped by using the four-wheel drive and front-end winch. This is quite an achievement when it is borne in mind that we have about 800 miles of line in Pennsylvania and New York, much of it through the mountainous terrain of western and northern Pennsylvania and southern New York.

Two-Way Radio

The first one of the utility welding trucks proved so successful that we have added two more for our general maintenance gangs. Now the delivered truck consists of bare chassis and cab with both winches already mounted, to which we add the body, welder, gin poles, and rod and tool boxes, One of the latter is also equipped with two-way radio.

Another valuable piece of equipment is the tractor with its appropriate trailer. For this purpose we use a 5-ton tractor on the usual 135-in. wheel base, which will take either a pole trailer or lowboy. The pole trailer is used for hauling pipe. The lowboy is used for hauling construction equipment, large portable pumps and engines, and other heavy and bulky equipment.

Still another type of mobile maintenance equipment is the heavy-duty farm tractor, though we do not have any in service. These tractors can be equipped with a cutting bar for brushing right-of-way or a snowplay for clearing roads around the pump stations, terminals, or maintenance warehouses. They can be readily transported on the smallest flat-bed trucks.

Under the heading of track-mounted vehicles are ditching machines. backhoes, bulldozers, and sidebooms. The ditching machine is principally used on new construction, most maintenance ditching being on too small a scale to warrant the average pipeline company purchasing one.

The backhoe is a power shovel which differs from the true shovel in that it digs toward the machine rather than away. The advantage lies in the fact that it works astride the ditch on solid ground whereas the shovel must work over the newly opened ditch. Most backhoes can be converted to shovels, draglines or cranes by use of auxiliary equipment.

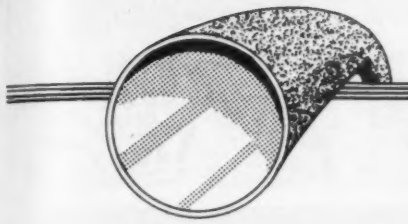
The bulldozer is a track-mounted tractor with a cutting blade mounted on the front end which can be lifted or lowered by the operator either by cable or hydraulic pressure. The blade is either perpendicular to the long axis of the tractor or at a slight angle, in which case it is known as an angle dozer. Actually, the latter is the most common type today. Frequently a winch operated from a power takeoff is mounted in back, increasing the usefulness of the machine for towing equipment. It is used for grading, backfilling, constructing fire walls, and so on. With the angle dozer, backfilling in particular becomes a continuous operation. Available in several sizes, the larger the machine the more powerful it is. On the other hand, the smaller-size bulldozers can be carried on maintenance trucks without the need of special hauling permits.

The sideboom, as its name implies, is a tractor with a boom on the sides operated by means of a winch. The weight of the boom and its load is counterbalanced by weights on the opposite side of the tractor. Basically a tractor with specialized attachments, it is available in the same range of sizes as is the bulldozer. It is used in practically all the operations involved in laying pipe, both new and reconditioned.

Our maintenance Is divided into district and general. Each of four districts has one general maintenance truck and a personnel carrier. The remainder is assigned to the general maintenance gang which takes care of such jobs as reconditioning, line changes, and new pump-station manifold construction.

The third and last group we have called air-borne equipment. Apart from its use in transporting executive personnel, the airplane or helicopter plays little part in pipe-line maintenance other than patrol. Since heavy equipment could not be transported by air, maintenance personnel would gain little by arriving quickly at the location of an emergency, if after arriving they had to wait for equipment to arrive by truck.

Air patrol as a supplement to ground patrol has proved thoroughly practical, particularly in the Middle West and Southwest. Large portions of the crude and product pipe-line network of the White Eagle Division of our company and Magnolia Petroleum Co. are covered by planes owned by White Eagle.



CORROSION and its control

What the Soil Does to Pipe

WHAT does it take to make a battery? Four things—an anode, a cathode, an electrolyte, and an external circuit. The anode and the cathode are two pieces of unlike metals, as the zinc and the carbon in a flashlight cell. The electrolyte is a solution—almost always containing water, like the paste in the flashlight cell and the sulfuric acid in a storage battery.

The external circuit can be any connection between anode and cathode through which current can flow; the switch, socket, and lamp of the flashlight, or the cables, car frame, starter switch, and starter windings in your car. Whenever either of these circuits is closed, so that current can flow, things begin to happen—and the things we are interested in at present are certain chemical changes which take place at the anode and the cathode.

At the anode there is active corrosion, with the evolution of oxygen; at the cathode there is no attack, but there is an evolution of hydrogen. What happens next depends on the composition and arrangement of the whole battery; in the flashlight cell both the oxygen and hydrogen are quickly absorbed by chemicals put there for that specific purpose, and something very similar happens in the storage battery.

It might also be pointed out that the "corrosion" that takes place on the anode of the storage battery is reversible, so that charging the battery puts it in the original condition; the corrosion in the flashlight cell, however, destroys the zinc, and when it is consumed the cell's life is over.

The formation of oxygen and hydrogen at the two electrodes may bring about a condition known as polarization, with a considerable increase in the internal resistance of the cell, and a consequent falling off in current output. The depolarizing agents in both dry cells and storage batteries cannot keep pace with rapid discharges, so both of these batteries show a renewed life after a short rest when they have been exhausted by a heavy drain.

When we bury a pipe line in the soil, we have one piece of metal in an electrolyte. Where are the anode, the cathode, and the external circuit? The last three are all in the pipe itself! Some areas on the pipe act like anodes, some like cathodes; and the pipe between them acts as the connecting circuit, although it is certainly misleading to call it "external."

There are several different reasons why one part of a pipe should act like an anode with respect to another. It is not essential that they actually be of different metals, like zinc and carbon, or zinc and copper; in the storage battery both sets of plates are of lead, or combinations of lead and lead compounds.

New Pipe Takes Brunt

Similarly, some of the corroding cells on the pipe owe their existence to the different iron compounds appearing as mill scale or atmospheric rust. For example, a tool mark or scratch, or the raw metal exposed by cutting threads, will almost invariably be anodic with respect to the "as rolled" or "mill" surface of the remainder of the pipe. Likewise, new pipe buried and connected with old pipe, is anodic to the old pipe, and thus takes the brunt of the corrosion. This leads quite commonly to the observation that "the steel they make now isn't as good as it used to be."

Other corroding cells are set up by virtue of the fact that different parts of the pipe are in contact with different soils. This is a variation of what the electrochemist calls a "concentration cell." A particularly vicious cell of this type is that which results when the pipe rests on a narrow strip of unexcavated soil along the bottom of the ditch, while the rest of its circumference is in contact with the mixed, watered, and aerated soil of the backfill. This makes the very bottom of the pipe anodic with respect to the remainder, and gives the all-too-familiar pattern of a row of pits right along the bottom.

When the pipe is first buried, a vast number of anodic and cathodic areas come into being; there is corrosion on all the anodes, hydrogen evolution at all the cathodes. As time passes, some of the weaker anodes polarize to the extent that they become cathodes. Since the cathodes are the areas that do not corrode, this looks like a step in the right direction. The unfortunate part about it, though, is that the fewer remaining anodes continue to discharge the same total current, or very nearly so, which means that they corrode faster and faster—until finally one or more perforations appear.

The hydrogen film which forms at the cathodes is capable of arresting the flow of current—and thereby the corrosion—but conditions underground are nearly always favorable to its steady removal; the soil usually contains depolarizers, which, if not so efficient as those in the flashlight cell, are sufficiently so to permit the destroying current to continue at a considerable rate. Oxygen from the air is frequently responsible for combining with and thus removing the hydrogen; and the air has better access to the upper part of the pipe than to the lower. Thus it is seen that aeration combines with the effect described above to further accelerate pitting action along bottom of line.

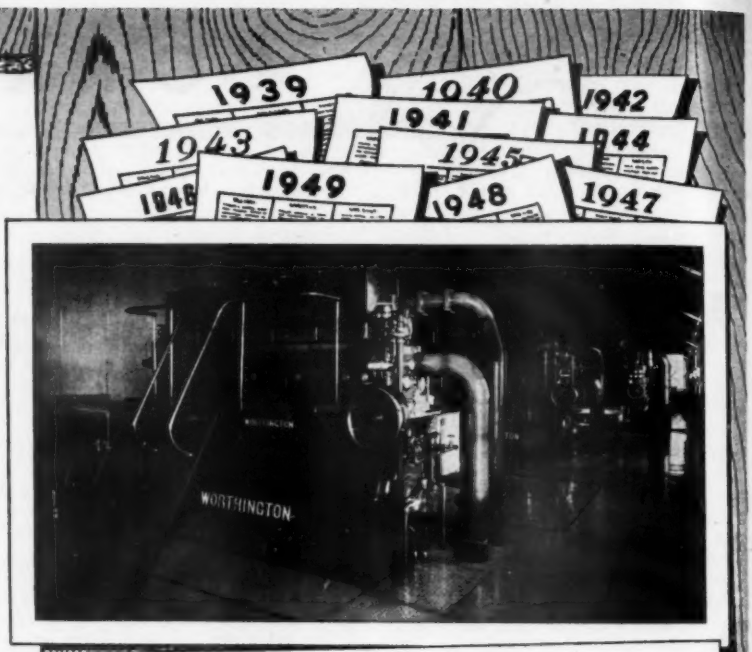
Besides different metals, different soils, different aeration, there are many other differences which may set up an active cell; almost any difference at all in the conditions at two points on the surface may be responsible for the creation of a corroding cell; the only thing that prevents such action on the part of some of them is the fact that other cells in the same vicinity are stronger.

The length of time required for corrosion to penetrate the pipe wall completely depends, obviously, on the violence of the attack and upon the thickness of the pipe wall. It does not follow that it will take twice as long to penetrate ½-in. pipe as it will ¼-in.; the corrosion rate may slow down so much by polarization, and by the impeding action of the corrosion products themselves, that the thicker wall will last 5 to 10 times as long as the thin.

Under the worst conditions, soil corrosion may be so severe as to penetrate ⅜-in. pipe wall in 7 months! At the other end of the scale, there is bare pipe in the ground still carrying oil after 40 years of service. Literally hundreds of miles of line are exposed to conditions almost as severe as that cited which penetrated in 7 months, and many thousands of miles exposed to soil only slightly less corrosive.

Part 1 of a series by Marshall E. Parker, consulting engineer, Houston.

Ten years of trouble-free operation ...on crude oil fuel!



Three of the Utah Oil Refining Company's Five Worthington Diesel Engines on pipeline duty at Wamsutter, Wyoming.

Worthington Diesels Require Only Routine Monthly Inspection For Continuous Top Performance

How well can a Diesel engine perform on crude oil fuel? For an action-proved answer, consider the Worthington Diesels at the Wamsutter, Wyoming, pumping station of the Utah Oil Refining Co. Located near the crest of the Continental Divide, the plant pumps crude oil (daily maximum: over 40,000 bbls) from sources in Colorado to points east and west.

Five Worthington Diesels, ranging from 250 to 820 hp, are used. Two were installed late in 1939; the others in 1946, 1947 and 1949. *All burn crude oil of 32° gravity.*

High altitude and harsh winters make operating conditions severe, yet the two oldest Worthingtons — until after ten years and nearly 50,000 hours each of steady duty — *had never had their pistons pulled or valves ground.* And the other three give every indication of equalling this long, trouble-free record!

MORE EXAMPLES

Wherever oil is moved through pipelines, Worthington Diesels are serving. Latest Worthington supercharged and atmospheric Diesels are successfully burning crude oil from lines stretching across Texas. Almost half a century of experience with every type of crude oil fuel has provided a sound background for assured customer satisfaction with modern Worthington Diesels.

Crude oils, Diesel oil, some residue oils, natural gas, producer gas — all are successfully fueling modern Worthington Diesels and spark ignition engines — in almost every type of power service. For further facts proving *there's more worth in Worthington*, write to *Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.*

WORTHINGTON

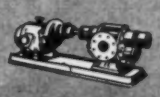
E.O.4

YOUR PARTNER IN POWER PROGRESS

Diesel engines, 150 to 3,520 hp . . . gas engines, 175 to 3,520 hp . . . dual fuel engines, 225 to 3,290 hp.

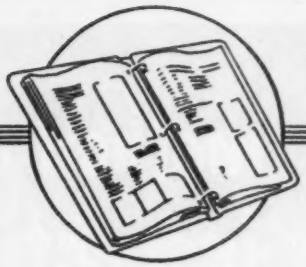
WORTHINGTON-BUILT AUXILIARIES

Balanced Angle Compressors


Oil Transfer Pumps

Cooling Water Circulating Pumps

Evaporative Type Engine Water Cooler



THE REFINER'S notebook

No. 58

Grease Reduces Friction*

TO get a better understanding of the reason why resistance to motion is encountered when two surfaces rub against each other observe a highly magnified view of a polished metal surface such as is found in an ordinary journal bearing. The drawing on this page was made from a photograph taken through an electron microscope which magnifies the area about 38,000 times.

Causes and kinds of friction.—No matter how smooth the metal surface may appear to the unaided eye, nor how smooth it may feel, it is in reality an extremely jagged area of "mountains" and "valleys." These tiny "peaks" (technically called asperities) are largely responsible for friction in modern machines. As two dry bearing surfaces slide over each other, the opposing high spots come in contact and ride over each other. Entire load of the bearing is supported by the asperities which represent much less than the total area of bearing surface. The actual area of contact at a given instant under such circumstances may be as little as one ten-thousandth of the apparent bearing area. Thus, a calculated bearing load of 1 psi. may actually be exerted at the rate of 10,000 psi. on the high spots.

Under such high pressure these tiny areas become very hot; may even come close to the melting temperature of the metal. The asperities may become soft and "smear"—or they may weld together; then tear apart as the bearing continues to move. Or, the clashing asperities may break each other off by sheer force. In any case, rapid and destructive wear takes place along with the development of much heat.

Friction may exist as: (1) **Sliding friction**—resistance to motion developed when two surfaces slide over and rub against each other under pressure; (2) **Rolling friction**—encountered when a body with a spherical, cylindrical, conical, or other curved surface rolls over the surface of another body; and (3) **Fluid friction**—the resistance to flow offered by any fluid material, a physical phenomenon usually measured as viscosity.

One function of the lubricant is that of making bearing surfaces slippery so that the least possible amount of effort is required to overcome the resistance to motion caused by friction. In most cases this is accomplished by interposing a layer of fluid material between the contacting surfaces so that fluid friction is substituted for sliding friction. This procedure is highly effective because fluid friction is only a small fraction of what the unlubricated sliding friction would be. No lubricant ever entirely overcomes friction—it only lessens or minimizes it. Consequently it is possible to have different degrees of friction reduction.

Degree of friction reduction.—The maximum degree of friction reduction exists when a full fluid film of lubricant is maintained. The act of lubricating is a dynamic affair, possible only when there is motion. For example, in a plain bearing, the tendency of the journal, with its load pressing it down to the bottom of the bearing, is to "squeeze" the lubricant away from the areas of contact. But, when the shaft revolves, it drags particles of the lubricant down under itself. This forms a wedge of the lubricant that gets under the shaft and lifts it up from contact with the bearing so that the opposing asperities do not touch. Such ideal conditions do not exist at all times in any bearing. A greater or lesser amount of sliding friction is developed during some phase of the operation of the average mechanism.

When a continuous lubricant film is temporarily interrupted due to shock loading, or to simple "overloading," the resulting condition is known as mild boundary lubrication. Here, metal-to-metal contact may result—at least temporarily—and sliding friction develops accompanied by excess heat and wear. Conditions of mild boundary lubrication are very common—in fact, almost every type of mechanism undergoes such conditions during some phases of its operating cycle. To overcome this, it is extremely important to employ lubricants that maintain a thin lubricating film even when the thick film of lubricant has been disrupted or squeezed out.

The third and most critical degree of lubrication is known as extreme boundary lubrication. In this case the conditions are very severe—usually due to extremely high pressure per unit of bearing area. This degree of lubrication is also often referred to as an extreme-pressure condition. Extreme-pressure lubrication usually requires the use of chemicals which, when added to the lubricant, will prevent "galling" or welding of particles of metal from one surface onto the other.

*From material supplied by Shell Oil Co. on "Fundamentals of Lubricating Greases."

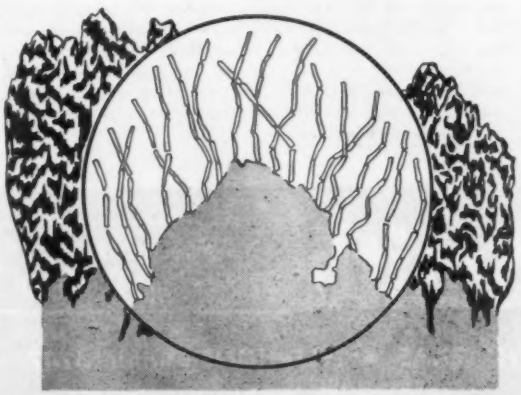
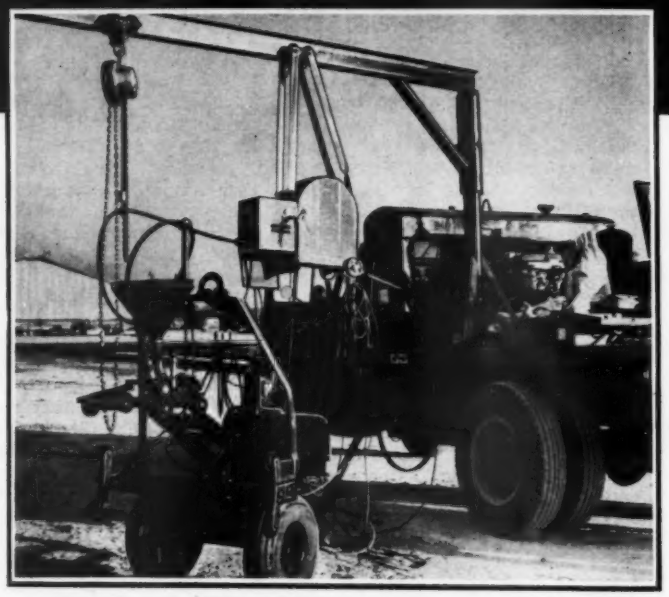


Illustration is based on electron microscope photo, showing "smooth" carbon steel magnified 38,000 times. Insert shows how soap molecules may adhere to crags and crevices of metal surface and form, together with oil molecules held by them, a relatively thick and protective film.

Now... a tested method of welding to meet today's inspection standards!



The SMITH SUBMERGED ARC SEMI-AUTOMATIC WELDING UNIT

The O. R. Smith organization has made an entirely new approach to the problem of double-jointing and sectioning all sizes of pipe from 4 inch to 36 inch under "firing line" conditions. The primary aim has been to develop an economical, yet effective method of sectionizing pipe, with the smallest possible amount of equipment to maintain lightness and mobility in the field. This aim has been achieved to a remarkable extent when it is realized that the whole rig is about one-tenth the weight of the equipment previously used for doing the same work.

The effectiveness of the equipment was recently demonstrated at the Brown & Root pipe yard at Greens Bayou, Houston, when over 100 sample welds were produced using 40 foot lengths of 16" pipe. As the welding is carried out entirely by the submerged arc process without any tacking or hand stringer bead, a higher degree of uniformity and quality is obtained than when submerged arc welding is used in conjunction with a manual stringer bead.

The actual welding operation is simplified by several automatic and self adjusting features on the equipment. The height of the weld above the surface of the pipe, width, and the penetration on the inside of the pipe, may be regulated by various combinations of these adjustments in addition to the welding speed, amperage and voltage, etc.

Numerous tensile tests have been made on welds produced by this process, which show that the welded metal is invariably stronger than the pipe, and a Bend Test of 180 degrees has no effect on the weld. There is no weakening of the pipe adjacent to the weld as the inside of the pipe is protected from sudden chilling by the internal line-up clamp, and the heat retained by the clamp gives the next joint of pipe a preheating which is desirable when welding while the atmospheric temperature is low.

Examinations of the micro-structure of the welds indicate perfect fusion has taken place between the pipe and the weld. As the second pass follows immediately upon the first, the metal does not have a chance to cool, and the relatively high amperage produces sufficient heat to penetrate about two-thirds of the way into the first weld, while the heat retained by the protective coating of slag completes the normalizing process to give the weld strength and ductility.

for full information phone, wire or write:

O. R. Smith

Specialists in Pipeline Welding

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PIPE LINES

Corrosion Course

Pipe liners will study new methods of control

PIPE - LINE foremen, superintendents, engineers, and inspectors will be instructed in the newest methods for practical control of corrosion at the second annual Tulsa short course for pipe liners. Sponsored by the Tulsa Section of the National Association of Corrosion Engineers, the course will be held at the Mayo Hotel, Tulsa, February 21-23. It is estimated that approximately 200 pipe liners will attend.

The first two days will be given to class instruction in basic principles, instruments and practices. There will be field demonstrations on the third day. The "why" and "how" of corrosion control will be conveyed to field men so that they may participate more effectively in corrosion-mitigation operations. Attention will be given to the cost and repair of leaks.

PROGRAM

Wednesday, February 21

8:00 a.m.: Registration.
9:00 a.m.: Introduction.—J. N. Hunter, Jr.
9:30 a.m.: "Corrosion and Its Control."—Y. W. Titterington.
1:30 p.m.: "Coatings."—F. E. McNulty.

Thursday, February 22

8:30 a.m.: "Corrosion Surveys."—J. R. Cowles.
9:30 a.m.: "Rectifiers."—L. B. Nelson.
1:30 p.m.: "Expendable Anodes."—L. A. Hugo.
3:30 p.m.: "Instruments and Insulation."—J. R. Cowles.
5:30 p.m.: Fellowship Hour.

Field demonstrations will be conducted simultaneously at four pipe-line locations near Tulsa and repeated throughout the day, on Friday, February 23.

The school will divide into four groups for attendance at each field demonstration in turn—two in the morning, two in the afternoon.

Friday, February 23

8:30 a.m.: Buses leave west entrance of Mayo Hotel for first two field locations.
Noon: Lunch—Spartan Cafeteria, east of city (all groups).
1:00 p.m.: Buses leave Spartan Cafeteria for last two field locations.

The four field demonstrations will show: (1) Coating and wrapping application; (2) installation and testing of insulating flanges; (3) methods for installing rectifiers; and (4) installation of magnesium anodes.

Requests for further information should be addressed to T. D. Williamson, Jr., Box 4038, Tulsa. An information desk will be maintained at the Mayo Hotel throughout the course to facilitate contact with all class and demonstration activities.

Great Lakes to Build Line

KANSAS CITY, Mo.—Great Lakes Pipe Line Co. will start construction this spring of an 8-in. line from Des Moines to Iowa City, Iowa, Harry Moreland, Great Lakes president, has announced. The new line will provide increased capacity to the company terminals at Iowa City and Chicago.

The line will parallel an existing 6-in. line which was laid in 1930 as part of the original system of the company. The added capacity to Iowa City will make it possible to abandon secondary stations between there and Des Moines, and will also make available an increased barrelage of products for movement to Chicago.

To pump this additional volume,

SHAPING UP.—Instructors and planning committee of Tulsa Section of National Association of Corrosion Engineers, preparing for the second annual Tulsa short course for pipe liners to be held February 21-23. Shown left to right are: Loyd B. Nelson, Shell Pipe Line Corp.; L. A. Hugo, Phillips Pipe Line Co.; Hugh A. Brady, Gulf Refining Co.; J. N. Hunter, Jr., Service Pipe Line Co., (chairman); and Yale W. Titterington, Dowell Incorporated. Two instructors not shown are Frank E. McNulty, Pittsburgh Coke & Chemical Co., and J. R. Cowles, Oklahoma Natural Gas Co. Also absent is Maynard H. Jackson, committee member, Middle West Coating & Supply Co.

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Pipeliners, who for years have struggled with heavy, multi-bolt blind flange closures and leaky-thread bull plugs on scraper traps, are welcoming this easy-operating UNIBOLT Scraper Trap. You just release two bolts, and s-w-i-n-g the trap cover, or blanking plug, out of the way. A sturdy hinge carries the load. It's compact, it eliminates heavy lifting, and there's no danger of the closure falling on the workmen. Swing it shut, tighten two bolts, and the line is ready for business again!

Any line or unit that requires closures, such as the Gas Line Blowdown shown at left, or strainers, separators, scrubbers, mist removers and similar pressure vessels, may be UNIBOLT-equipped to real advantage. Wherever a blind flange is applicable, a UNIBOLT Coupling with Blanking Plug will do the job better . . . seal tighter, reduce weight, and save time.

THORNHILL-CRAVER CO.

HOUSTON TEXAS

existing stations at Prophetstown and Lee, Ill., will be returned to use, and the 6-in. line placed on 50-mile operation from Des Moines to Chicago.

Construction also will include erection of tankage at both terminals and modernization of transport-loading facilities at Iowa City, where an office building and laboratory also will be built.

Utah Hearings Continue

SALT LAKE CITY.—Utah Natural Gas Co. has asked the Utah Public Service Commission to issue it a conditional certificate of necessity for construction of Utah Natural's proposed $32,000,000 pipe line.

Previously the company had asked only for permission to construct the line. The certificate of necessity would authorize it to proceed with financing and construction of the line as well as development of natural-gas fields in the area.

The proposed line would stretch 392 miles from San Juan County in northwestern New Mexico to Salt Lake City. It would serve industrial users in Salt Lake and commercial and residential users in small communities in Utah and Colorado along the route.

Fuel for the project would be obtained from Angel's Peak, Blanco, Large, and Glade areas in San Juan County. Utah Natural estimates 1 trillion cubic feet of natural gas would be available to pipe through the line.

John A. McGuire, president of the firm, said the company is ready to begin construction of the line without assurance of immediate profits from its operations.

McGuire had testified earlier that 100,000,000 cu. ft. of gas daily would need to be sold to assure profitable operation. Later he said the company would begin construction if no more than 76,000,000 cu. ft. of gas could be sold daily to begin with. He said he had enough confidence in the future of Salt Lake City to go ahead on that basis.

Texas Line Break Repaired

WACO, Tex.—Threats of a critical shortage of natural gas over a wide area of Central Texas after a break occurred in Lone Star Gas Co.'s 16-in. line near Temple were eased when emergency crews repaired the break early Saturday.

The line was repaired at 9:15 a.m., and Lone Star officials said gas pressures in most of the towns returned to normal Sunday.

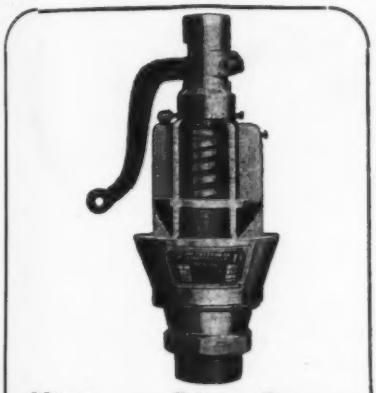
Gas service was disrupted to more than 18,000 customers when the line broke about 5:20 a.m. All gas to industrial users was cut off. Residents and business men in more than a dozen cities and towns were asked by radio and sound trucks to save gas in order that hospitals and power plants might be supplied.

Reserve Estimate Disputed

SALT LAKE CITY. — A geologist for Delhi Oil Co. has questioned whether estimates of natural-gas supplies made by Utah Natural Gas Co. in regard to its proposed $32,000,000 line are accurate.

The attorney, Jack F. Dougherty of Dallas, Tex., appeared for Delhi Oil, which has intervened in the case now being heard by the Utah Public Service Commission. Delhi Oil Co. is the parent company of Utah Pipe Line Co., which also has filed for permission to construct a pipe line into Salt Lake valley.

(Continued on page 123)



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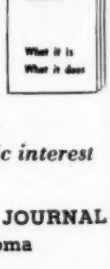

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Tulsa 1, Oklahoma

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Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Gulf Refining Co., Tulsa, Pipe Line Division.—72 miles, 6-in., under way, El Dorado, Kans., to Webb City, Okla.; Pipeline Service Co., contractor. J. W. Welcher Atlanta, Kans., spreadman.

Pan American Pipe Line Co.—80 miles, 10-in., under way, from southern part of Scurry County, Texas, to a connection with Humble pipe line near San Angelo, Tex.; Brown & Root, contractor.

Phillips Pipe Line Co.—53 miles, 6-8 in.; under way; Wheeler, Tex., to Sweeny, Tex.; O. R. Burden Construction Corp,, contractor.

Phillips Pipe Line Co.—35 miles, 10-in.; authorized; Brownfield, Tex., to Plains, Tex.

Phillips Petroleum Co.—285 miles, 10-in., authorized, Borger, Tex., to Yale, Okla.

Platte Pipe Line Co.—1,080 miles, 20-in., underway, Chatham Station, Wyo., to Wood River refining area in Illinois; R. H. Fulton, contractor, Chatham Station, Wyo., to Holdredge, Neb.; Bishop & Lock, contractor, Holdredge, Neb., to Nebraska-Kansas line; Ramsey Brothers, contractor, Nebraska-Kansas line to Missouri River; O. R. Burden, contractor, Missouri River to Mississippi River.

Portland Pipe Line Co. (Montreal Pipe Line Co., Ltd.).—85 miles, 18-in., under way, Portland, Me., to Gorham, N. H.; Oklahoma Contracting Co., contractor of Section 1; H. A. Waylie, Westbrook, Me., superintendent.

Portland Pipe Line Co. (Montreal Pipe (Canada).—321 miles, 18-in., contracted, Gorham, N. H., to international boundary near N. Troy, Vt.; Associated Pipeline Contractors, Inc., contractor of Section 2, Lacy Walker, Barton, Vt., spreadman.

Portland Pipe Line Co. (Montreal Pipe Line Co.).—68 miles, 18-in., contracted. Canadian boundary to Montreal; Fred Mannix, contractor of Section 3.

Sinclair Pipe Line Co.—700 miles, 22-in., planned; Drumright, Okla., to Chicago.

Texas Pipe Line Co.—56 miles, 12¾-in., Chico to Wichita Falls, Tex.; R. H. Fulton & Co., contractor; M. L. Boyd, spreadman, Henrietta, Tex.

Products Pipe Lines

Great Lakes Pipe Line Co.—355 miles, 12-in., authorized, Kansas City through Omaha and Sioux City Iowa, to Sioux Falls, S. D.

Plantation Pipe Line Co.—432 miles, 14-13-in., Baton Rouge to Bremen, Ga.—to Charlotte, N. C., Williams Brothers, Co., contractor. Completion scheduled by end of 1951.

Salt Lake Pipe Line Co.—140 miles, 8-in., contracted Boise, to Baker, Idaho; Bechtel Corp., contractor.

Susquehanna Pipe Line Co.—126 miles, 8⅝-in., under way, Toledo, Ohio, to Sarnia, Ont., Canada; H. L. Gentry Construction Co., contractor. James Mitchell, Toledo, Ohio, spreadman.

Standard Oil Co. (Ind.).—50 miles, 8-in., under way, north of Sugar Creek, Mo., refinery; Lawhon Construction Co., Southern Mill & Mfg. Co., contractors.

Standard Oil Co. (Ind.).—144 miles, 8-in., authorized, Neodesha, Kans., to Sugar Creek, Mo.

Natural-Gas Pipe Lines

Atlantic Gulf Gas Co. (United Gas Pipe Line Co.).—1,530 miles, planned, Alabama-Florida-Georgia-South Carolina.

Cities Service Gas Co.—40 miles, 4-10 in., Kansas, field office, Liberal; Pat Gilmore, spreadman; Knup Construction Co., Inc., contractor.

Commonwealth Natural Gas Corp.—84 miles, 12-in., contracted, Richmond to Newport News, Va.; Ray L. Smith, contractor.

Commonwealth Natural Gas Corp.—104 miles, 18-in., under way, Stanardsville to near Petersburg, Va.; Ray L. Smith & Son, contractor, Don C. Smith, Orange, Va.; spreadman.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Consolidated Gas Utilities Corp.—41 miles, 12-in., planned, Enid to Blackwell, Okla., Marlow to Cement, Okla.

East Tennessee Gas Corp.—150 miles, 16-in., under way, Knoxville to Bristol, Tenn.

East Tennessee Natural Gas Co.—398 miles, 3-16-in., planned, Nashville to Chattanooga to Knoxville, Tenn., and laterals.

East Tennessee Natural Gas Co.—106 miles, 12-16-in., contracted, Lobelville to Tullahoma, Tenn.; Oman Construction Co., contractor.

East Tennessee Natural Gas Co.—130 miles, 12-in., under way, Athens, via Chattanooga, to Tullahoma, Tenn.; N. A. Saigh Co., Inc.

East Tennessee Natural Gas Co.—120 miles, 12-in., planned, Chattanooga to Knoxville, Tenn.; Walters & Saigh Construction Co.

East Tennessee Natural Gas Co.—185 miles, 16-in., planned, Lobelville to Chattanooga, Tenn., Walters & Saigh Construction Co.

Eastern Natural Gas Corp.—292 miles, 24-in., proposed, Phoenixville, Pa., via New Haven and Hartford, Conn., Providence, R. I., Springfield, Mass., and Boston.

Egyptian Natural Gas Co.—80 miles, 6-8-in., authorized, Norris City to Salem-Centralia, Ill., area.

El Paso Natural Gas Co.—450 miles, 24-in., under way, San Juan basin, New Mexico, to Franconia, Ariz.

Home Gas Co.—70 miles, planned, Orange, Sullivan, Rockland, and Cattaraugus counties, New York.

Magnolia Petroleum Co.—60 miles, 4-24-in., gathering system in LaWard and Lolita fields, Texas; Henry L. Lemons & Co., contractor. W. A. Remington, spreadman.

Michigan Gas Storage Co.—150 miles, 20-in., planned, Chelsa terminal-Winterfield and Cranberry Lake, Mich.; Mahoney Contracting Co., contractor.

Michigan-Wisconsin Pipe Line Co.—197 miles, 6-18-in., under way, Milwaukee to Green Bay and Two Rivers, Wis.; G. G. Griffis Construction Co., contractor. F. K. Egan, Fond du Lac, Wis.

MidSouth Gas Co.—40 miles, 12-in., Helena to Forrest City, Ark.; Tulsa Construction Co., contractor; Frank McCoy, spreadman; field office, Marianna, Ark.

Mississippi River Fuel Corp.—40 miles, 18-in., authorized, Dubach to Perryville, La.

New York State Natural.—164 miles, 16-in., planned, Ithaca to Albany, N. Y.

New York State Natural Gas Corp.—70 miles, 20-in., planned, North Oakford, Pa., to Ohio state line.

Northern Natural Gas Co.—597 miles, 20-26-in., contracted, ten loops from Texas to northern Iowa.

Northern Natural Gas Co.—76 miles, 4 to 12-in., under way, gathering line in vicinity of Hugoton, Kans., Cheek Construction Co., contractor, Troy Cheek, Ulysses, Kans., superintendent.

Northern Natural Gas Co.—111 miles, 24-in., under way, Ogden, Iowa, to St. Paul, Minn.; R. B. Potashnick, contractor.

Northern Natural Gas Co.—75 miles, 26-in., under way, north of Beaver, Okla.; R. H. Fulton & Co., contractor of Loop 2. Merele Lewellen, Mead, Kans., spreadman.

Northern Natural Gas Co.—72½ miles, 26-in., under way, Bushton to Minneapolis, Kans.; R. H. Fulton & Co., contractor of

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Loop 4. M. L. Boyd, Salina, Kans., spreadman.

Northern Natural Gas Co.—155 miles, 20-in., contracted, Garden City to Bushton, Kans.; R. H. Fulton & Co., contractor of Loop 5. Jerry Nash, Garden City, Kans., spreadman.

Northern Natural Gas Co.—222 miles, 26-in., under way, Borger, Tex., to Nebraska line; R. H. Fulton & Co., contractor. M. C. Boyd, Ashland, Kans., spreadman.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

Oklahoma Natural Gas Co.—53 miles, 26-in., Edmond to Depew, Okla.; Trojan Construction Co., contractor.

Oklahoma Natural Gas Co.—40 miles, 16-in., under way, Velma to Chickasha, Okla.; Trojan Construction Co., contractor.

Pacific Gas & Electric Co.—47 miles, 8-in., authorized, Salina to Kilig City, Calif.

Pacific Northwest Pipe Line Co.—400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

Pacific Northwest Pipe Line Corp.—2,175 miles, 26-in., authorized, Texas Gulf Coast to Pacific Northwest.

Panhandle Eastern Pipe Line Co.—356 miles, 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

Phillips Petroleum Co.—99 miles, 3-16-in., under way, Sherman and Hansford counties, Texas gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex.

Piedmont Natural Gas Co.—1,350 miles, 20-in., planned, Greenville, Miss., to Carolinas.

Plains Natural Gas Co.—120 miles, 4-24-in., contracted, Oklahoma-Kansas area, Hugoton field, gathering system; Midwestern Constructors, Inc., (Arey-Phillips Construction Co.) contractor. T. S. Nunley, Liberal, Kans., chief inspector.

San Diego Gas & Electric Co.—53 miles, 16-in., planned, San Diego County, California.

San Diego Gas & Electric Corp. (Southern Counties Gas Co.)—85 miles, authorized, San Diego, Riverside, and Moreno, California.

South Central Alabama Natural Gas Co., Inc.—150 miles, proposed, central Alabama.

South Georgia Natural Gas Co.—248 miles, planned.

South Jersey Gas Co.—75 miles, 10-12-14-in., under way, Pleasantville, N. J., to Bustleton, Pa.; G. G. Griffis, Inc., contractor, Ray Abney, Millville, N. J. spreadman.

Southeastern Michigan Gas Co.—55 miles, 12¾-in.; under way; Birmingham, Mich., to Port Huron, Mich.; H. L. Gentry Construction Co., contractor.

Southwestern Michigan Gas Co.—55 miles, 12¾-in., proposed, Oakland County to Marysville, Mich.

Southern Counties Gas Co. of California.—81 miles, 20-in., authorized, looping.

Southern Natural Gas Co.—18 miles, 18-in., under way, Gwinville, Miss., to Selma, Ala.; Sheehan Pipe Line Construction Co., contractor. Jim Brown, Meridian, Miss., spreadman.

Southern Natural Gas Co.—161 miles, 16-18-in., under way, Selma, Ala., to Elmore, Ala. Associated Pipeline Contractors, Inc., contractor. Lacy Walker and L. H. Gray, spreadman.

Southern Natural Gas Co.—138 miles, 20-22-in., planned, Chattanooga, Tenn., to Lexington, Miss.

Southern Natural Gas Co.—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

Southern Union Gas Co.—78 miles, 8-10-14-in., planned, New Mexico loops and laterals.

Sunray Oil Corp.—133 miles, 8-30-in., system for Snyder gasoline plant, Vaughn & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

Tennessee Gas Transmission Co.—102 miles, 16-in., under way, Bayou Sale to Kinder, La.; Latex Construction Co., contractor. H. L. Leake, superintendent.

Tennessee Gas Transmission Co.—700 miles, 20-26-in., planned. Burnaugh, Ky., to Massachusetts including 400-mile line to Buffalo.

Tennessee Gas Transmission Co.—95 miles, 20-in., under way, Natchitoches to Kinder, La.; Latex Construction Co., contractor. F. A. Silar, superintendent.

Tennessee Gas Transmission Co.—992 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

Tennessee Gas Transmission Co.—70 miles, 26-30-in. contracted, between Stations 104 and 110; Anderson Brothers Corp., contractor. E. C. McCoy and Arkie Hobson, Richmond, Ky., spreadmen.

Tennessee Gas Transmission Co.—174 miles, 30-in., under way, western Tennessee and Kentucky; Price-Morrison, contractor. Jack Hodges and R. L. McMillon, superintendents.

Tennessee Gas Transmission Co.—75 miles, 30-in., under way, from near Glasgow northeastward to near Lebannon, Ky.; Morrison Construction Co., contractor. R. L. McMillon, Adamsville, Tenn., spreadman.

Tennessee Gas Transmission Co.—99 miles, 30-in., under way, near Dickson, southwestward to near Selmer, Tenn.; H. C. Price, contractor. Jack Hodges, Linden, Tenn., spreadman.

Tennessee Gas Transmission Co.—170 miles, 26-30-in., contracted, Kentucky; Anderson Brothers Corp., contractor.

Texas Eastern Transmission Corp.—1,400 miles, 26-in., planned, Texas to Pittsburgh, loops.

Texas Gas Transmission Corp.—723 miles, 26-in., under way, Lisbon, La., to Middletown, Ohio.

Texas-Illinois Natural Gas Pipeline Co.—1,300 miles 30-in., under way, Corpus Christi area to Joliet, Ill.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 26-in., La Gloria to Refugio, Tex.; Midwestern Constructors, Inc., contractor of Schedule 1; M. T. Wilhite, superintendent; field office, Refugio.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 30-in., under way, Mississippi

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River to Effingham, Ill.; Midwestern Constructors, Inc., contractor of Schedule 11. M. T. Wilhite, superintendent; field office, Du Quoin, Ill.

Texas-Illinois Natural Gas Pipeline Co.—100 miles, 30 in., Effingham to Sibley, Ill.; Midwestern Constructors, Inc., contractor to Schedule 12.

Texas-Illinois Natural Gas Pipeline Co.—92 miles, 30-in., Sibley to Joliet, Ill.; Midwestern Constructors, Inc., contractor of Schedule 13.

Texas-Illinois Gas Pipe Line Corp.—409 miles, 30-in., contracted, Arkansas and Missouri; Bechtel Corp. A. M. Berlander, general superintendent; field offices at Newport, Ark., J. E. Richardson; Texarkana, Ark., V. L. Williams; Popular Bluff, Mo., A. M. Berlander.

Texas-Illinois Gas Pipe Line Corp.—126 miles, 30-in., contracted; H. C. Price, contractor. Work under way.

Trunkline Gas Co.—278 miles, 20-in., contracted, Valley of Texas; R. H. Fulton & Co., contractor.

Trunkline Gas Co.—1,775 miles, 10-26-in., planned, includes 740-mile, 26-in., Lake Charles, La., to Tuscola Station of Panhandle Eastern Pipe Line Co., and 1,035 miles, 10-24-in., Lake Charles, La., to McAllen, Tex., completion due October 1, 1952.

Trunkline Gas Co.—176 miles, 26-in., under way, Darnell, La., to Longville, La.; Houston Contracting Co., contractor of Section A, main line. E. C. Norris, Olla, La., spreadman. W. H. Hayes, spreadman, De Ridder, La.

Trunkline Gas Co.—180 miles, 26-in., contracted, Darnell, La., to Senatobia, Miss.; Anderson Bros. Corp., contractor, Section B, main line.

Trunkline Gas Co.—184 miles, 26-in., under way, Senatobia, Miss., to Paducah, Ky.; R. H. Fulton & Co., contractor of Section C. main line. Clark Williams, Memphis, Tenn., spreadman.

Trunkline Gas Co.—186 miles, 26-in., contracted, Joppa to Tuscola, Ill.; Mahoney Contracting Co., contractor of Section D, main line.

Trunkline Gas Co.—362 miles, 20-in., contracted, McAllen to Altair, Tex.; R. H. Fulton & Co., contractor of Section E and F, lateral lines.

Trunkline Gas Co.—217 miles, 24-in., contracted, Longville, La., to Altair, Tex.; Anderson Bros. Corp., contractor of Sections G and H, lateral line.

Trunkline Gas Co.—71 miles, 20-16-10-in., contracted, Longville, La., south; Houston Contracting Co., contractor of Section 1, lateral line.

United Gas Pipe Line Co.—51 miles, 12¾-in., proposed, Soso and Sherron fields, to near Meridian, Miss.

United Gas Pipe Line Co.—23 miles, 16-in., proposed, Mud Lake field, La., to near Port Arthur, Tex.

United Gas Pipe Line Co.—93 miles, 6 to 16-in., proposed, fields in Plaquemines Parish to near New Orleans.

United Gas Pipe Line Co.—26 miles, 20-in., planned, Louisiana, connecting with East Texas system.

United Gas Pipe Line Co.—90 miles, 16-in., planned, West Bay field to New Orleans.

Utah Natural Gas Co.—325 miles, 22-in., proposed, "Four Corners" in southeastern Utah.

Valley Gas Pipe Line Co., Inc.—500 miles, 24-in., proposed, Berclair, Goliad County, to northeast Saratoga, Hardin County, Texas, to Vermilion Bay area of Louisiana.

Valley Gas Pipe Line Co., Inc.—1,000 miles, 30-in., proposed, Saratoga northeast to Arcadia, La., to El Dorado and Jonesboro, Ark., Cape Girardeau, Mo., Lawrenceville, Ill., Terre Haute, Ind., and Atlanta, Ind., thence to northeast terminal point in southern Michigan.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Westcoast Transmission Co., Ltd.—1,406 miles, 30-in., planned, northern Alberta to Vancouver, B. C., and northern California.

Western Pipe Lines.—1,200 miles, 22-in., planned, Southern Alberta to Duluth, Minn.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

Cia. de Petroleo Ganso Azul, Ltd.—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

Condor S.P.A. (Shell).—80 miles, planned, Genoa to Rho, near Milan, Italy.

Direccion General de Yacimientos Petroliferos Fiscales.—400 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Iraq Petroleum Co., Ltd.—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

Middle East Pipelines, Ltd.—800 miles, 34-36-in., planned, Iran to a Levantine port.

Petroleos Mexicanos.—160 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

Petroleos Mexicanos.—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

Shell Caribbean Petroleum Co.—11 miles, 16-in., authorized; Bachaquero (north) to Lagunillas, Venezuela, 5-51.

Shell Caribbean Petroleum Co.—165 miles, 30-in., authorized; Palmarejo to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 12-51.

Foreign Products Pipe Lines—Planned and Under Way

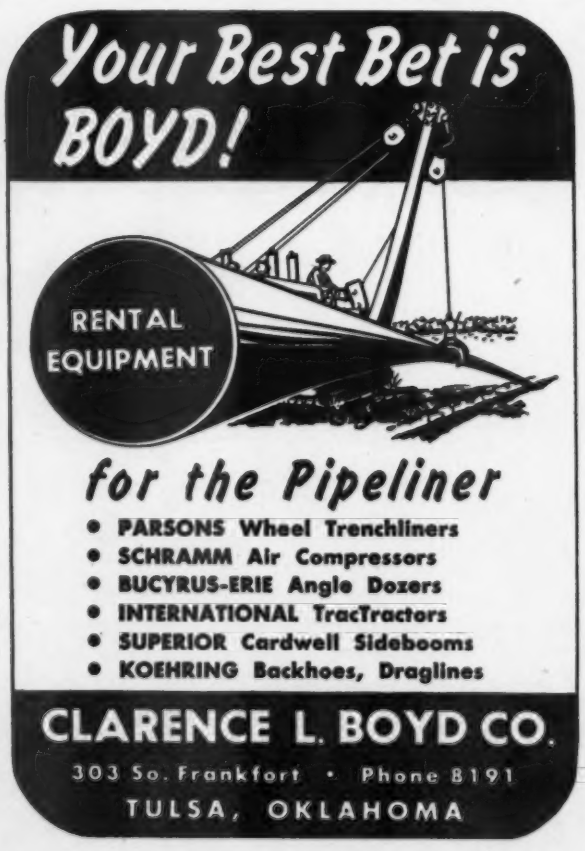
Colombia Ministry of Petroleum.—90 miles, 6-in., planned, Puerto Berrio to La Dorada, Colombia.

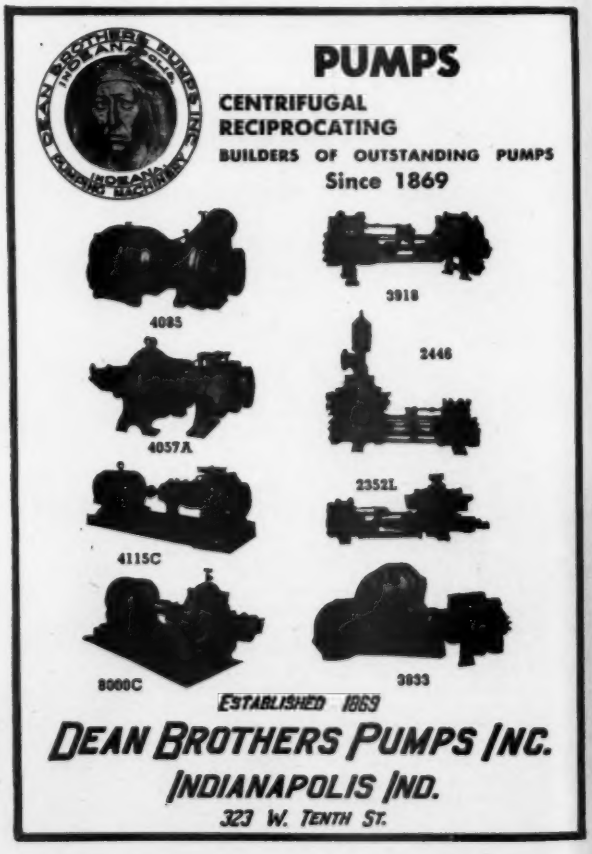
Colombia Ministry of Petroleum.—183 miles, 4-in., planned, Puerto Berrio to Medellin, Colombia.

Colombian Ministry of Petroleum.—75 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

Estrada de Ferro Santos Jundiai.—32 miles, 10-in., under way, Santos to Sao Paulo, Brazil; Techint, contractor.

Estrada de Ferro Santos a Jundiai.—33 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor.





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Northern Pipe Line, Ltd.—300 miles, 10-in., planned, Montreal, Que., to Toronto, Ont., Canada.

Petroleos Mexicanos.—160 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

State of Cundinamarca, Colombia. — 120 miles, planned, Puerto Salgar, to Bogota, Colombia.

Foreign Natural-Gas Pipe Lines—Planned and Under Way

Azienda Generale Italiana Petroli.—Under way, Lodi to Milan, Italy.

Azienda Generale Italiana Petroli.—Under way, Lodi to Turin, Italy.

Azienda Generale Italiana Petroli.—Under way, Lodi to Genoa, Italy.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

Direccion General del Gas del Estado.—62 miles, under way, Comodoro Rivadavia to Caleta Olivia, Argentina.

Northwest Natural Gas Co.—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos. — 205 miles, 16-in., considered, Monterrey to Torreon, Mexico.

Petroleos Mexicanos.—260 miles, 20-in., considered, Monterrey to Tampico and Poza Rica, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas, to Mexico City, D. F.

Venezuela Atlantic Transmission Corp.—195 miles, 10-12-16-in., planned, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaira, Maracay, and Valencia.

Pipe Lines

(Continued from page 117)

Dougherty challenged a statement by another geologist, Kenneth M. Willson, that Boundary Butte field contained an estimated 348,000,000,000 cu. ft. of natural gas. Boundary Butte is one of three fields which Utah Natural's line would tap.

Dougherty said that by comparing geology of Boundary Butte field with that of nearby Barker Creek zone in New Mexico he would estimate reserves of the field at 50,000,000,000 cu. ft. He said that only by the use of core analysis of all wells drilled could an accurate estimate of reserves be made.

Utah Natural has estimated that total reserves of gas to supply the line run around 1 trillion cubic feet. These reserves are all concentrated in the Angel's Peak, Blanco, Large, and Glade areas in San Juan County.

FPC Hearing Scheduled

WASHINGTON.—The Federal Power Commission has scheduled a hearing for February 13 on the application of Wabash Natural Gas Co. of Evansville, Ind., for authorization to build ½ mile of 4-in. transmission line for the transportation of natural gas to Consumers Gas Co. for distribution in Carmi, Ill.

Wabash also seeks an order directing Texas Eastern Transmission Corp. to connect its system with the proposed line and to sell gas to Wabash. Estimated cost of the Wabash facilities is $15,000.

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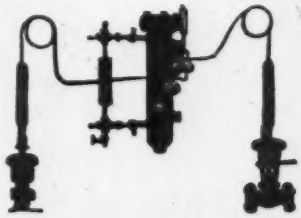

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Shallow Water Refining Company recently put on stream a new 1200 barrel per day Perco Cycloversion unit at its refinery in western Kansas. This major step in its modernization program was designed by Koch Engineering Company, Wichita. This Cycloversion installation may be operated to desulfurize and reform cracked and straight run gasolines. Excellent octane improvements are attained. Write us for full information on profits in Cycloversion for your Company. Perco Division, Phillips Petroleum Company, Bartlesville, Oklahoma.

REFINING

New Gulf Cracker

Changes in unit design to increase efficiency

PORT ARTHUR, Tex.—New designs directed at reducing initial costs and improving process efficiency are being incorporated in the big fluid catalytic cracking unit now under construction here for Gulf Oil Corp.

The unit, designed and being built by M. W. Kellogg Co., will have a reactor throughput of 60,000 bbl. per day. It is claimed to be the largest ever done completely by an engineer-contractor.

The regenerator of the big cracker is designed to operate at higher temperatures than those normally used in existing fluid units. According to Kellogg, this will permit faster regeneration of catalyst, and also decrease the amount of catalyst that must be circulated to maintain the necessary heat in the reactor.

Higher temperatures require the use of a special stainless-steel standpipe from the regenerator, but this is offset by the reduction in size of specially formed catalyst-carrier lines.

Reactor change.—Another design change is found in the reactor, where the stripper is incorporated entirely within this vessel and above the grid rather than below. The stripper is actually a separate vessel within the reactor and requires less supporting steel than designs which place the stripper outside the vessel.

In a further deviation from past designs, the new cracker has the flue-gas exhaust stack supported atop the regenerator, thus permitting the elimination of a separate structure to support this outlet, and at the same time decreasing the amount of piping necessary. A special vent has been designed which permits this construction while providing for almost complete suppression of the noise which is frequently associated with the venting of flue gas from such an operation.

New Salt Lake Cracker

SALT LAKE CITY.—The largest Houdriflow catalytic cracking unit (13,000 bbl. per day capacity), to go on stream to date has been placed in operation by Salt Lake Refining Co. at its refinery here. The new installation is circulating catalyst at the rate of 300 tons per hour by means of the new gas lift.

The Houdriflow process, introduced in 1948, was the first to make use of the gas-lift principle for transporting pellet-type catalyst as used in moving-bed units, according to Brig. Gen. D. N. Hauseman, president of Houdry Process Corp. The use of gas lift eliminates catalyst-flow limitations formerly encountered with elevators on T.C.C. units.

A wide range of catalyst-oil ratios is possible in the process at higher catalyst-circulation rates. This increases the operating flexibility and permits liquid feed stocks to be charged without vaporization.

Another advantage claimed by Houdry for its gas-lift process is a major simplification in the kiln which makes it possible to superimpose the reactor and kiln, meaning that the catalyst is lifted only once.

In addition to the Salt Lake unit, five Houdriflow units have been in operation in the United States since early in 1950, and four others are nearing completion.

Plant Sets Output Record

LOS ANGELES.—General Petroleum Corp.'s Torrance refinery set a new plant record for the week ended January 25, it has been revealed by Gale L. Adams, vice president in charge of manufacturing.

The refinery processed a daily average of 130,262 bbl. of crude oil through the week. Of this crude, 125,670 bbl. per day were charged to the refinery's crude-distillation units which have a rated capacity of 100,000 bbl. per day. The remaining 4,592 bbl. were heavy crude and were charged to what is normally a secondary-processing unit.

T.C.C. Process Licensed

PITTSBURGH.—Socony-Vacuum Oil Co., Inc., has licensed the chemical-plants division of Blaw-Knox Co. to design and build catalytic cracking plants using Socony's patented processes, including the company's Thermofor catalytic cracking process.

The chemical-plants division, a Blaw-Knox unit which specializes in the engineering and construction of process plants and equipment, will embody the patented processes in plant designs tailored to meet individual needs of refiners, based on pilot-plant studies of specific oil stocks.

Shell Designs New Drum

DAYTON.—A new steel drum designed to reduce transportation cost, speed handling, and save warehouse space has been proposed by Shell Oil Co. At its bulk plant here the company recently demonstrated the new drum before military repre-

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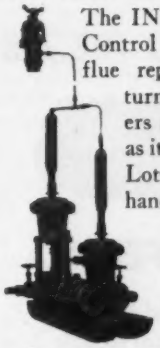

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sentatives and members of the petroleum-packaging committee of Packaging Institute, Inc., a working group for American Petroleum Institute and National Lubricating Grease Institute.

Slightly taller and slimmer than the standard drum now in use, the new design will permit loading four abreast, double-decked in the average truck trailer, and five abreast double-decked in box cars eliminating the waste space encountered in loading drums of current design.

A further feature of the new proposed drum design facilitates stacking. Each drum has a "necked in" head about 2-in. smaller than the diameter of the remainder of the drum. In stacking, the bottom rim of the top drum will fit over the smaller head of the bottom drum.

This feature eliminates the necessity of palleting drums when stacking in tiers for shipping or storage. Modified fork trucks, equipped with gripper arms which seize the drums around their sides, can be used to stack drums two high whereas standard drums are usually lifted to the second tier on pallets and placed by hand.

Gulf to Produce Alcohol

PITTSBURGH.—Gulf Oil Corp. has revealed plans to install additional equipment at its Port Arthur refinery for the production of 9,000,000 lb. of isooctyl alcohol per year. The facilities are expected to be in operation by the end of 1951.

Isooctyl alcohol is used extensively in the chemical industry in the manufacture of vinyl plastics.

The Gulf plant will be the second isooctyl-alcohol plant in the Gulf Coast area, adding to the output of an existing unit capable of producing 30,000,000 lb. per year at another major oil-company refinery. Although Gulf did not reveal the type of process to be employed, it is understood that it will be an adaptation of the Oxo process, utilizing ethylene as the principal olefin raw material.

Oil-Tax Collections Up

WASHINGTON.—Collections from the three federal oil taxes amounted to $665,072,792 last year, topping 1949's $603,145,384 by $61,927,408, the Internal Revenue Bureau reported.

The bureau announced that the 1950 collections included $551,449,723 from gasoline against $504,063,429 in 1949; $91,747,997 from lubricating oils against $80,317,326; and $21,875,071 from pipe-line transportation against $18,764,629, the first time pipe-line revenue has gone over the $20,000,000 mark.

Returns for December included $48,845,077 from gasoline against $46,588,601 for the same month in 1949; $6,790,020 from lubricating oils against $4,809,913; and $2,524,867 from pipe-line transportation against $1,536,331, a new monthly high.

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NATURAL GAS

Ohio Gas Storage Planned

WASHINGTON.—Ohio Fuel Gas Co. plans to convert six natural-gas-producing pools in Ohio to underground-storage space, and has applied to the Federal Power Commission for authorization to construct necessary pipe-line facilities. The company testified that the pools have an ultimate-storage capacity of about 37.5 billion cubic feet.

Ohio Fuel applied for permission to construct about 74.2 miles of high-pressure lines for the storage project, and to remove about 53.2 miles of existing well and field lines. Compression facilities would also be increased by 10,780 hp., and 47.5 miles of new 20-in. line constructed to transport gas to market areas.

Total estimated capital cost of the proposed construction is $6,425,200. Funds for the construction will be provided by Ohio Fuel's parent company, Columbia Gas System, Inc.

Three of the proposed storage pools are located in Ashland County, two in Hocking County, and one in Knox County. The 47.5-mile, 10-in. line would be constructed from Benton Township in Hocking County to Columbus.

Ohio Fuel said it hopes to commence the construction program early in 1951, and complete the entire project by November 1952.

Michigan Gas to Expand

DETROIT.—More than $6,000,000 has been earmarked for construction in 1951 by Michigan Gas Storage Co.

The largest single expenditure will be to acquire the former Riverside gas field. Addition of this field will raise the company's underground-storage area in North-Central Michigan to more than 57,000 acres, and will increase by approximately 20 per cent its deliveries of natural gas during winter-demand periods.

The additional storage, plus anticipated greater supplies of natural gas from Panhandle Eastern Pipe Line Co., is expected to place the company in position to meet the increased demands from industry which Michigan Gas expects as a result of the rearmament program, according to D. E. Herringshaw, vice president. The company estimates the expanded storage program will enable it to deliver up to 330,000,000 cu. ft. of natural gas daily to the 257 Michigan communities it serves.

Panhandle Hearing Set

WASHINGTON.—Petitions by Texas Gas Transmission Co. and Indiana Gas & Water Co. asking the Federal Power Commission to direct delivery of gas from Panhandle Eastern Pipe Line Corp. will be heard February 19.

The former companies ask that Panhandle Eastern deliver 12,000,000 cu. ft. of natural gas per day to Texas Gas at its connection with Panhandle near Danville, Ind., during the 1950-51 heating season, and such additional quantities in the future at this delivery point as Texas Gas may request up to the full contractual obligation of 18,000,000 cu. ft. per day. Indiana Gas purchases from Panhandle and Texas Gas.

The commission denied Panhandle's request for dismissal of both petitions.

Price-Fixing Power Claimed

AUSTIN. — Latest development in the clamor for a minimum gas price in Texas is the advancement here of a theory that the Texas Railroad Commission has the power under a law unused for 28 years to fix price of gas.

The commission never has attempted gas-price fixing. It determines twice yearly the prevailing price of gas in Panhandle field but does not set it.

Will Mann Richardson, Tyler attorney for the Panola County Royalty Owners Association, asked the commission "to fix and establish and enforce the adequate and responsible price of gas" in the field.

The latest of several laws proposed in the Texas Legislature in the attempt to fix a minimum price has been filed by Rep. R. E. Blount of Big Spring, Tex. It would establish a minimum of 10 cents per M.c.f. He also introduced a bill to double the tax, making it 11.44 per cent of value at the well.

Along with the minimum price, it would boost the tax take from natural gas about four times over, making it $32,000,000 per year.

O. N. G. Cutbacks Raise Howl

OKLAHOMA CITY.—State Sen. James Nevins, Okmulgee, has expressed fear that Henryetta, Okla., may lose a $20,000,000 zinc smelter because of a lack of an adequate, continuous natural-gas supply.

The senator's opinion was disclosed last week after Oklahoma Natural Gas Co. had cut back gas supplies to some industrial users over the state by as much as 75 per cent in the wake of the nation-wide cold snap.

The gas curtailments caused widespread disturbance in the state, with both houses of the state legislature adopting resolutions to investigate the gas-supply squabble, and the Oklahoma Corporation Commission ordering immediate restoration of service by O.N.G. to industrial users.

Joseph Bowes, president of O.N.G., said the company would not carry out the commission's order immediately on the grounds that the company is entitled to 10 days' notice from time of issuance. He said the company has plenty of gas, but that transportation limitations create shortages in extreme weather due to increased domestic use.

All cutbacks have been according to contract with industrial users, Bowes said. This same cutback system is adopted by gas companies in the North and East, and curtailments are much more frequent there, he said.

Panhandle Appeals Case

WASHINGTON.—A ruling by the Michigan Public Service Commission holding that Panhandle Eastern Pipe Line Co. must obtain a certificate of public convenience and necessity from the commission in order to make direct sales of natural gas to Ford Motor Co. in Michigan will be contested by Panhandle in the United States Supreme Court.

Panhandle contends that the Michigan commission was acting outside the bounds of its authority to prohibit such a sale, since it is a sale in interstate commerce and therefore not within the state's power to prohibit.

The sale to Ford proposed by Panhandle would be transacted in the area served by Michigan Consolidated Gas Co. The Michigan Supreme Court upheld the Michigan commission, and it is from that decision that Panhandle now has appealed to the Supreme Court of the United States.

Natural Gasoline

Magnolia Plans New Plant

LONGVILLE, La.—Plans for construction of a casing-head gasoline plant in Hurricane Creek field, Beauregard Parish, about 5 miles from this city, have been announced by R. D. Hanley, vice president of Magnolia Petroleum Co. and manager of the company's natural-gas department.

Plant site has been acquired, and engineering-design details are expected to be worked out soon to permit construction to start at an early date.

Plant plans include gathering and utilizing the field's casing-head gas, processing facilities for the recovery of liquid hydrocarbons, and delivery of residue gas to a gas-transmission pipe line.

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Among the Drilling Contractors

Increases Reported In Number of Active Rigs

OVER-ALL drilling activity in the United States and Western Canada as reflected by the number of operating rotary rigs picked up slightly during the week ended January 29 (latest survey). The pick-up interrupted the seasonal downward trend that had been felt since the middle of December.

Operating rigs during the above week totaled 2,215, an increase of 56 over the number reported the preceding week. Before this increase, the number had declined 350 since the middle of December, at which time the total had climbed to an all-time record of 2,521.

Most significant gains during the week were in the Illinois Basin and Kansas-Oklahoma areas.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	Week ended	Change week ended 1-22-51	Change week ended 1-30-50
Gulf Coast	535	+ 6	+ 39
W. Tex.-N. M.	718	+ 5	+ 30
Ark.-N. La.-E. Tex.	135	— 1	— 1
Oklahoma	268	+ 3	+ 39
Kansas-Nebraska	144	+17	+ 43
Illinois-Eastern	71	+28	+ 10
Rocky Mountains	111	— 2	+ 45
Pacific Coast	129	0	— 3
Total U. S.	2,111	+56	+202
Western Canada	104	— 2	+ 45
Total	2,215	+54	+247

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and the West Texas-New Mexico and Kansas-Oklahoma areas are shown by charts on pages 150 and 151.

Tennant Contracts for Seven Nebraska Wells

Sam Tennant Drilling Co., Blackwell, Okla., is working on a contract with Stephens Petroleum Co. of Oklahoma City calling for the drilling of seven wells in the Falls City field, in southeastern Nebraska.

Longhorn Has Contracts For Two More Wildcats

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has been awarded contracts for two additional Southwest Texas wildcat tests. One is for a 7,000-ft. test to be drilled for Amerada Petroleum Corp. in northeastern Webb County. It will be 1 Traylor & Nunley, located in the northeast corner of Section 806. The other is for a 6,300-ft. test to be drilled for Skelly Oil Co. in northern La Salle County. It will be 1 John J. Schorp, located in the Mary Lattimer Survey No. 5-A-1050. Location is just south of the Frio County line.

Santa Fe Rig Drilling Multi-Well Locations

Two years ago this month, Santa Fe Drilling Co. moved a large rotary rig to a well site for Union Oil Co. in the Sansinena field, near Whittier, Calif. After drilling one vertical and 12 directional wells from this "island," the rig was moved 1,700 ft. west. It is now completing the eighth well from this location.

Santa Fe's toolpusher on the job throughout this period has been P. J. Thayer, who now should be well qualified in public-relations work. Since the activity is in an area of good homes and small lemon groves, much of his time has been spent in acquiring and maintaining the good will of the surrounding residents. To this end, drilling is done with a soundproofed rig, truck transportation is

P. J. Thayer (center), toolpusher for Santa Fe Drilling Co., with Robert Ingram (left) and Carl Bowden, junior engineers, Union Oil Co., in front of soundproofed derrick at multi-weld location in Sansinena field, near Whittier, Calif.

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taboo between 6 p.m. and 8 a.m., and all other activities are conducted so that noise is kept to a minimum.

Cotton With Mercury

D. W. Cotton, Enid, Okla., a partner with Chester H. Westfall of Tulsa in the Mercury Drilling Co. of the latter city, plans to take a more active part in the operation of the company following his resignation as executive vice president of Champlin Refining Co. of Enid. Previously, he devoted much of his time to the latter company, with which he has been associated since 1921. He will continue as a director of the Enid company and to make his headquarters in that city.

O'Meara at Houston

O'Meara Brothers Drilling Co., Shreveport, has created a new district office at Houston. M. L. Londot, formerly located in the headquarters office, will be in charge.

Norwood at Midland

Allen Norwood, Norwood Drilling Co., Wichita Falls, Tex., has moved to Midland, where he will have charge of his company's drilling operations in the West Texas area.

Big Chief Drilling Co., Oklahoma City, has contacted with Stanolind Oil & Gas Co. to drill 1 USA C SW SW 22-7n-5e, 3 miles northwest of Lucien, Franklin County, Mississippi. Contract is for 10,800 ft. to test the lower Tuscaloosa horizon.

Roy L. Pepper, Odessa, Tex., has a rig running for Dallas Consolidated Petroleum Co. at 1 Pape, a projected 4,500-ft. Ellenburger exploratory test in Block 74, San Miguel Survey, 7½ miles northeast of Ballinger, Runnels County, Texas.

Mack Drilling Co. will move a rotary rig to a wildcat test which Harry Hubbard has started on the Onion Creek Prospect 30 miles above Moab on the Colorado River in Utah. The test, located in the NE NE 12-24s-23e, has been drilled to 455 ft. with cable tools.

Fred Morgan, Oklahoma City, is contractor and a partner with K. A. Ellison and L. J. Horwitz in a projected Springer sand test for the Doyle Townsite pool area in northeastern Stephens County, Oklahoma. Specific location has not been announced. Projected depth is 6,500 ft.

Murfin Drilling Co., Wichita, has a rig running for V. B. Sidey of Russell, Kans., on a semiwildcat location in southwestern Rooks County, Kansas. Test is 2 Matheson, SE SE SE 13-10-16.

Austin Stewart Drilling Co., Shreveport, holds contract on the Pan-Am Southern 1 James McClure, proposed Wilcox test in section 31-8n-1e, 4½ miles southwest of Fayette, Jefferson County, Mississippi.

T & C Drilling Co., Midland, Tex., has started drilling on a 9,600-ft. wildcat test located 7 miles northeast of Hart, Castro County, Texas Panhandle. The test, 1 McDaniel, Section 12, Block 9-T, T&NO Survey, is being drilled under contract for Anderson-Prichard Oil Corp.

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Rods, Fluid End, Steel, Bronze, Stress Proof Steel, Hardened and Ground Alloy Steel, Stainless Steel

Pistons, Iron, Steel, Bronze, Stainless Steel, Regular Type, Ring Grooved Type, Bull Ring Type, Lubrikup

Rods, Steam End, Steel, Stress Proof Steel, Stainless Steel

Valves and Parts, Bronze, Iron, Steel, Balata and Bakelite Gland Bushings, Bronze and Babbitt

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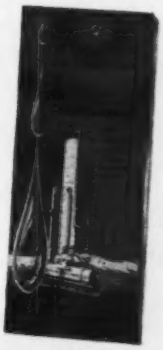

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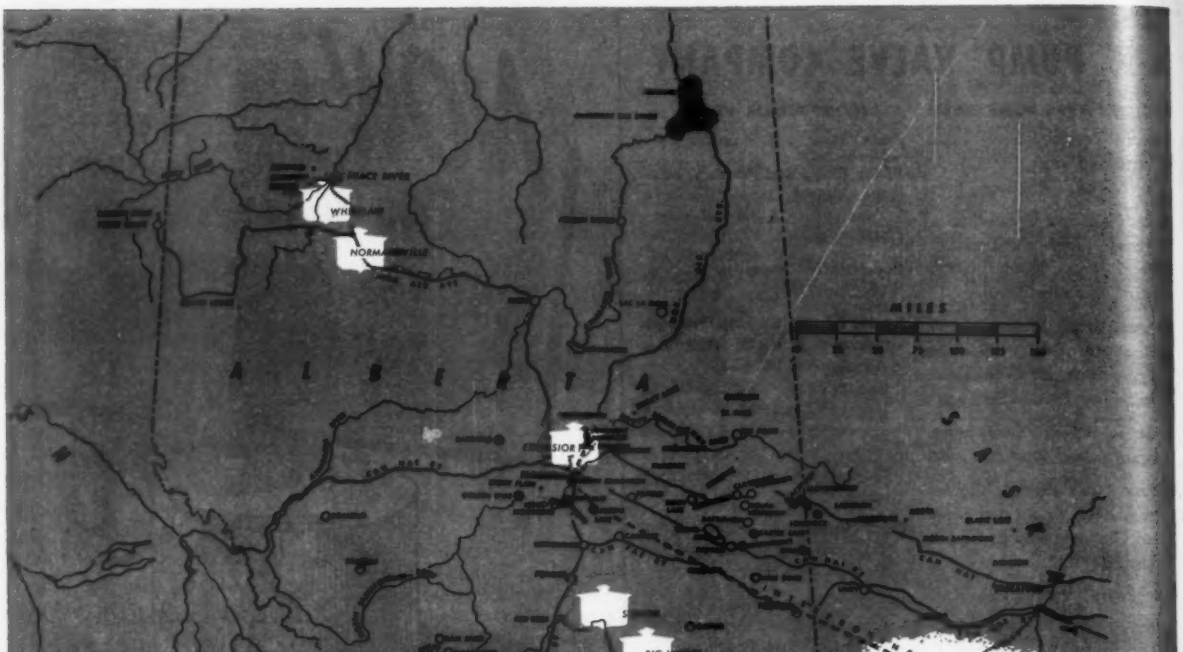

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Exploration and Drilling

Rumblings from Manitoba

RUMBLINGS in the form of reports from Canada on the initial testing results of California - Standard Co.'s well in the southwest corner of Manitoba may well be the forerunner of a long-expected eruption of an oil boom in this province and areas to the northwest and south in the same sedimentary unit.

California - Standard 15-18 Daly, some 600 miles east and south of the concentration of oil fields in Alberta, has indicated oil in commercial quantities on preliminary tests.

This wildcat test, located after several years of intensive geological and geophysical work in the immediate area, was drilled to a depth of 5,368 ft. Starting from this depth, which put the bottom of the hole in basement rocks, California-Standard began testing up the hole. After reaching a plug-back depth of 2,340 ft., 140 ft. below the casing shoe, the open formation was acidized and on swabbing tests yielded about 3 bbl. of fluid per hour. This fluid was estimated to be about 70 per cent 35°-gravity oil and 30 per cent water, most of which was believed to be drilling fluid and acid water. Actual production testing will get under way as soon as a pump and storage tanks are moved onto the site.

California - Standard's well is located about 170 miles west of Winnepeg and 9 miles west of Virden townsite. Spot is 15 18-10-27w1. This puts the well in the shallow northeastern shelf area of the large but sparsely tested Williston basin.

Though the Williston basin is generally recognized as being favorable for oil accumulations, up to now, at least, it has defied limited efforts to uncover oil in commercial quantities. In the January 25 issue of The Oil and Gas Journal on page 383 a few notes on the Williston basin were given with emphasis placed on Amerada Petroleum Corp.'s deep test on a sizable structure in the thick heart of the basin which had recovered a pint of oil from a Devonian limestone. In these notes it was brought out that many geologists believe that the shallower areas back from the deeper part of the basin, such as the area in southwest Manitoba, offer the better hunting grounds in this sedimentary unit. It was stated that these geologists are counting on the existence of a depositional environment during Devonian time similar to that which existed in central Alberta.

Whether or not the oil being recovered in the Manitoba well is coming from the Devonian is yet to be confirmed, but it is believed that it is. If the oil is coming from the Devonian those geologists who see possibilities of large accumulations of oil in Devonian limestones around the edges of the Williston basin in Saskatchewan, North Dakota, and South Dakota as well as in Manitoba are going to find their prospects easier to sell.

Certainly there are no indications of a large well in Manitoba, but that is not the point here. Many large pools have been discovered by small wells, but even if California-Standard's well does not prove to have opened a large pool its significance in the over-all picture is not lessened. Its true significance lies in the fact that it has uncovered oil in an area where many operators have bought heavily in acreage but have been reluctant to drill when no positive indications that oil in commercial quantities might be found.

If this Manitoba test makes a commercial oil well there is going to be an accelerated movement of actors onto the Williston-basin stage which has been setting up for the past 4 years. Ever since the strikes in Central Alberta began there has been an enormous amount of attention devoted to the Williston basin. Leasing in North and South Dakota and acreage acquired under permit in Manitoba and Saskatchewan climbed to boom proportions a few years ago. It is reported that three California companies have recently completed a block of more than 2 million acres in North Dakota and are planning six exploratory wells, with the first to spud this spring.

Though a few barrels of oil do not make an oil field nor give positive proof that there is enough oil for commercial development, nor even the promise of other pools in the area, you can count on something happening when the first few barrels of oil are recovered in an area that sound - thinking geologists consider probable oil-producing territory.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—California Co.'s discovery in the Red Wash area, Utah, flowed 512 bbl. of oil in 24 hours through ¼-in. choke from the Green River (Tertiary) formation. Continental Oil Co. recovered oil on drill-stem test of an apparent new-pay discovery in South Elk Basin field, Wyoming.

SOUTHWEST TEXAS.—Wilcox production has been opened in Eagle Hill field, Duval County, at Ralph E. Fair-Woodward & Co. 1 J. P. Foster Unit 1. Through perforations at 7,116-30 ft., 7,154-70 ft., 7,208-19 ft., and 7,334-36 ft., the well flowed 10,000,000 cu. ft. of gas daily, open flow gage.

WEST TEXAS.—Southwest of Odessa, in Ector County, Texas Co. completed its 1 Andrew Fasken as a Tubb sand discovery, or 2-mile northwest extension of a recent discovery. Texaco's well flowed 122 bbl. of oil a day from pay at 6,065-6,340 ft. Ted Weiner's 1-16 Driver completed for 303 bbl. of oil a day, giving Midland County another Spraberry pool. North of Peck and Pegasus fields, and about midway between them, C. W. Murchison 1 Canon has established a possibility of joining the two areas, if present trends prove productive. The well had good flowing production from both the Pennsylvanian and the Ellenburger and completed from both zones.

Southwest Texas

Wilcox Pay Zone Opened In Eagle Hill Field

CORPUS CHRISTI.—Wilcox production has been opened in Eagle Hill field, Duval County, at Ralph E. Fair-Woodward & Co. 1 J. P. Foster Unit. On open-flow gage, through perforations at 7,116-30 ft., 7,154-70 ft., 7,208-19 ft. and 7,334-36 ft., the well flowed 10,000,000 cu. ft. of gas per day. The well was drilled to a depth of 7,892 ft. and operators set 7-in. pipe at 7,892 ft. for completion. Deepest production in Eagle Hill field previous to the new pay was approximately in the 2,500-ft. horison. The discovery is located in the Charles Adami Survey 206, Abstract 1,641, 10 miles north of Freer.

In Hidalgo County, L. M. Lockhart has opened gas-condensate production at his 1 First National Bank of Chicago, Lot 11, Block 3, Alamo Land & Sugar Co. Subdivision, Los Torritos - Maximo Dominquez Grant, Porcion 72. Through perforations at 8,510-26 ft., the well flowed 6,900,000 cu. ft. of gas per day plus 35 bbl. of condensate per million cubic feet of gas. Shut-in pressure was 4,435 psi. Operator set 5½-in. pipe to 7,859 ft. and a 4-in. liner to total depth of 8,975 ft.

Bass & Vessels 1 Pena Heirs, wildcat in Share G, Santa Teresa Grant, Starr County, has been completed as a dual oil and gas well. Through 24 shots at 5,534-41 ft., the discovery flowed 53 bbl. of 43.6°-gravity oil daily from the Frio sand. Tubing pressure was 515 psi. Production was through ¼-in. choke. The well flowed gas through perforations at 4,534-69 ft. No gage was made on the gas production and the well was shut in.

Ryan, Hays & Burke have abandoned 1 George Sealy Estate, Juan I. Diaz Survey 41, Abstract 176, McMullen County, after it failed to pump more than 2 bbl. of oil per day over a 2-week period. Bottomed at 6,012 ft., the well was produceing from 3,262-69 ft. It was acidized with 250 gal.

The 48 new locations include 14 wildcat starts, 1 each in Jim Hogg, Jim Wells, Nueces, Starr, Dimmit, Frio and Wilson counties, 2 each in San Patricio and Webb counties, and 3 in Duval County. There were three successful exploratory wells completed, one each in Duval, Hidalgo, and Starr counties, while nine were dry, one each in Kerr, McMullen, Milam, and Jim Wells counties, and five in Duval County.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Duval County: New pay at Eagle Hill—Ralph E. Fair-Woodward & Co. 1 J. R. Foster Unit 1, Chas. Adami Sur. 206, A-1,641, 10 mi. N of Freer, TD 7,892 ft., perf. Wilcox 7,116-30 ft., 7,154-70 ft., 7,208-19 ft., and 7,334-36 ft., IP: 10,000,000 cu. ft. of gas per day on open flow, SIP 2,483 psi.

Hidalgo County: Gas-condensate discovery—L. M. Lockhart 1 First National Bank of Chicago, Lot 11, Block 3, Alamo Land & Sugar Co. Subd., Los Torritos-Maximo Dominguez Grant, Porcion 72, TD 8,975 ft., perf. 8,510-26 ft., IP: 6,900,000 cu. ft. of gas per day plus 35 bbl. of condensate per million cu. ft., open-flow gage, SIP 4,425 psi.

Starr County: New pay at North Sun—Bass & Vessels 1 Arturo Pena Heirs, Santa Teresa Grant, 3 mi. E of Santa Elena, TD 6,001 ft., perf. Frio 5,535-41 ft., IP: 53 bbl. oil per day, ⅛-in. choke, TP 525 psi., 43.6° gravity, perf. 4,534-69 ft. in K-1 sand, IP: 30,000,000 cu. ft. of gas per day, open flow, SIP 1,855 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: Appell, Daubert & Achning 1 Dionisio Garcia, Jose Marcelo Hinojosa Grant, 5 mi. S of Realitos, dry, TD 5,310 ft.

Sam C. Dunlap 1 Frank L. Morris, BS&F Sur. 65, A-91, 7 mi. SE of Freer, dry, TD 3,360 ft.

O. W. Killam 1 V. Gruy, M. E. Gussett Sur. 394, A-1,125, 20 mi. W of Benavides, dry, TD 2,523 ft.

LaGloria Corp. 1 Dinn, SK&K Sur. 440, A-1858, 18 mi. SW of Benavides, dry, TD 3,617 ft.

Tiger Minerals, Inc., A-1 Lucille Gruy Estate, J. Poitevent Sur. 393, A-483, 24 mi. SW of Freer, dry, TD 1,855 ft.

Jim Wells County: Appell Drilling Co. 2 George Reynolds, George Raynolds Sur. 1, A-391, 4 mi. W of Orange Grove, dry, TD 4,656 ft.

Kerr County: A. Edmiston 1 Gus F. Schreiner, Block D, HE&WT RR Sur. 7, dry, TD 1,640 ft.

McMullen County: Dan R. Foster 1 fee, Two Rivers Ranch Subd., Sec. 28, 5½ mi. SE of Tilden, dry, TD 1,400 ft.

Milam County: E. Fletcher 1 Jerry L. Kostroum, Depena 11 League Grant, 5 mi. SW of Buckholts, dry, TD 1,860 ft.

Permian Basin

New Pennsy Production Found in Concho County

MIDLAND.—New Pennsylvanian production was reported in southwest Concho County and two offsets were getting under way. The discovery is CB Drilling Co. and Jack Collins 1 Pfluger, 5 miles southwest of Eden. The pay section has tentatively been identified as Canyon reef sand.

The Pfluger test was originally projected to 4,000 ft. in search of Ellenburger production but stopped at 2,141 ft., set casing on bottom, and perforated from 2,121-24 ft. A preliminary 8-hour test through open 2-in. tubing received an estimated 50 bbl. of oil with some water.

On completion potential, held to 15 hours for lack of tanks, the well flowed 63.7 bbl. of 34°-gravity oil through open tubing. Flowing pressure was 25 psi. Oil was to be trucked approximately 40 miles to Shell Pipeline Co.'s Menard station.

CB and Collins filed to drill a second test to the sand as a northwest offset. Morgan Drilling Co., Midland, has staked location on an east offset.

Ralph Lowe 1 J. E. Hill, Midland County prospect, had retainer set and was to perforate and test in clean sand after flowing about 20 bbl. of oil per hour from the Wolfcamp in open hole between 9,440-9,850 ft., plugged-back total depth. Previously the well had recovered considerable clean 33°-gravity oil on a drill-stem test in the sand from 9,100-78 ft.

East of Midland, James H. Snowden 1-58 McClintic, Spraberry wildcat, continued testing, making an average of 5-6 bbl. of oil per hour. The section at 7,212-49 ft. had been treated with Hydrafrac.

Southwest of Midland, Ted Weiner 1-16 J. W. Driver, Spraberry discovery south of the Tex Harvey field, was completed for a flowing potential of 303.62 bbl. of 37°-gravity oil a day, through 3/16-in. choke. Top of the Spraberry was 7,110 ft. and total depth was 7,325 ft.

Completion has been reported on Cities Service Oil Co. 1 Waddell, Winkler County wildcat which is a northwest offset to Phillips Petroleum Co. 1 Waddell, Ellenburger discovery in 5-B7-PSL, and since designated as Northwest Wheeler field.

Cities Service 1 Waddell had the Silurian at 8,908 ft., Fusselman at 9,239 ft., and the Ellenburger at 10,764 ft., being high to the discovery on the first two and low on the last formation. Total depth was 10,860 ft., plugged back to 9,475 ft. and perforated from 9,350-9,400 ft. Completion potential was 1,738 bbl. of 32°-gravity oil a day through ¾-in. choke on tubing. Tubing pressure was 400 psi. and gas-oil ratio was 597 cu. ft.

James H. Snowden 1-32 Carrie S. Dean, northeastern Dawson County wildcat, recovered 7,900 ft. of salt water on a 1-hour drill-stem test in the Pennsylvanian at 8,392-8,700 ft. Operators set casing at 7,500 ft. to test the Spraberry, which developed some oil at 7,273-7,313 ft. and at 7,398-7,425 ft.

To the northwest, Snowden's 1-30 Dean prepared to drill ahead at 7,686 ft. after running electrical logs.

C. W. Murchison 1 Canon has been completed both from the Pennsylvanian and the Ellenburger. Location in 13-41-T&P is about 2½ miles northeast of the Peck field and the same distance northwest of the Pegasus field, in Midland County.

Completion potential was 16 bbl. of oil an hour from the Pennsylvanian at 10,465-530 ft., and 360 bbl. in 26 hours from Ellenburger perforations at 13,110-163 ft. and open hole at 13,175-185 ft. On elevation of 2,890 ft., it had the Pennsylvanian at 10,295 ft., and the Ellenburger at 13,120 ft.

Hiawatha Oil & Gas Co. 1 J. Forrest Runge, north Schleicher County wildcat, ran a 12-hour drill-stem test from 5,636-64 ft. in the Strawn. Gas showed in 8 minutes but fluid did not reach the top while the tool was open. When pipe was pulled, it unloaded 2,000 ft. of 40°-gravity oil and 1,000 ft. of oil-cut mud, with no formation water. Following the cold weather, which had suspended operations, it was to drill ahead 10 ft. and test again. An earlier test, identified as the lower Canyon reef, developed a flow of 6 bbl. of 40°-gravity oil an hour from perforations at 5,610-20 ft. Top on the Canyon reef was 5,595 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Pecos County: C. H. Murphy & Co. 2 M. E. Ford, 3-3-H&TC, 5 mi. E Imperial, TD 6,076 ft., elev. 2,390 ft., McKee sand perf. 5,175-83 ft., flowed 336 bbl. 43°-gravity oil a day, 12/64-in. choke, TP 900 psi., GOR 789 cu. ft.

Winkler County: Cities Service Oil Co. 1 Waddell, 5-B7-PSL, TD 10,860 ft., PB 9,475 ft., elev. 3,101 ft., Fusselman 9,239 ft., perf. 9,350-9,400 ft., flowed 1,738 bbl. 32°-gravity oil a day, ¾-in. choke, TP 400 psi., GOR 597 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Seaboard Oil Co. 1 C. C. Canon, 47-33-5n-T&P, 15 mi. SW Gail, dry, TD 8,404 ft., Spraberry 6,230 ft., Dean 7,260 ft., reef 8,352 ft.

Cochran County: Stanolind Oil & Gas Co. 5 J. E. Edwards, deep test in Landon Strawn field, dry, TD 12,641 ft., elev. 3,808 ft., Wolfcamp 8,800 ft., Mississippian 10,195 ft., Devonian 11,330 ft., Ellenburger 12,445 ft., pre-Cambrian 12,635 ft.

Crockett County: Magnolia Petroleum Co. 1 Addie Clayton, 9-1-GC&SF, 11 mi. NE Ozona, dry, TD 9,510 ft., elev. 2,407 ft., Ellenburger 8,620 ft.

Crosby County: Plymouth Oil Co. 1 H. E. Fisher, 86-8-H&GN, 16 mi. S Crosbyton, dry, TD 8,424 ft., elev. 2,491 ft., San Andres 1,690 ft., Clear Fork 3,040 ft., Strawn 7,604 ft., Mississippian 8,020 ft., Ellenburger 8,394 ft.

Culberson County: A. T. Barrett, Jr. 1 Thomas, 10-59-T1-T&P, 12 mi. NE Kent, dry, TD 2,840 ft.

Ector County: Stanolind Oil & Gas Co. 2 J. L. Johnson, Jr., 32-43-1S-T&P, dry, TD 4,490 ft.

Garza County: A. R. McElreath 1 R. G. Spinning, 9-5-GH&H, 7 mi. SE Post, dry, TD 2,808 ft., San Andres 2,085 ft.

Griffith Production Co. 1 John Bier, 1-D4-GC&SF, dry, TD 3,435 ft.

Howard County: Norman & Roche 1 R. E. Martin, 2-31-1N-T&P, 7 mi. N Coahoma, dry, TD 9,374 ft., elev. 2,457 ft., Glorietta 3,125 ft., Spraberry 5,358 ft., Dean 6,492 ft., reef 8,330 ft., Mississippian 8,845 ft., Ellenburger 9,327 ft.

Texas Pacific Coal & Oil Co. 1 N. H. Reed, Acct. 1, 23-25-H&TC, 11 mi. N Coahoma, dry, TD 8,089 ft., elev. 2,501 ft., Spraberry 5,175 ft., Wolfcamp 6,180 ft., Dean 6,365 ft., reef 7,780 ft.

Loving County: Gordon I. Logan 1 Nelson heirs, 41-29-PSL, dry, TD 4,908 ft., Delaware sand 4,855 ft.

Lubbock County: Bankline Oil Co. et al 1-A Earl E. Elliott, 33-JS-EL&RR, 4 mi. NW Lubbock, dry, TD 11,406 ft., elev. 3,270 ft., San Andres 3,460 ft., Glorietta

4,850 ft., Clear Fork 5,370 ft., Tubbs 6,430 ft., Spraberry 7,110 ft., Mississippian 10,630 ft., Ellenburger 11,130 ft.

Pecos County: M. H. McWhirter 1 Hart-Johnson, Susan Thompkins Sur. 2, 14 mi. SW Imperial, dry, TD 1,125 ft.

Sutton County: E. B. Fletcher 1 C. W. Adams, 66-A-GWT&P, 40 mi. E Sonora, dry, TD 4,261 ft., elev. 2,025 ft., Ellenburger 3,650 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Saunders field of Lea County has been given a new project at Atlantic Refining Co. 1-S State, 28-14s-33e. Location of the 10,000-ft. test is between The Texas Co. 1-AN State, 2-mile north extension in 22-14s-33e, and the field proper. The extension well completed for approximately 700 bbl. of oil a day from pay at 9,875-9,900 ft.

In Chaves County, Shamrock Oil & Gas Corp. 1 Livingston, 13-8s-29e, was drilling below 6,834 ft. following a 25-minute test from 7,451-69 ft. which recovered sulfur water.

Honolulu Oil Corp. 1 McConkey, 10-9s-26e, was drilling below 6,070 ft. in lime and shale. Drill-stem test in unidentified formation at 5,915-64 ft. recovered 30 ft. of mud in 4 hours.

Magnolia Petroleum Co. 2 Headley-Federal, 31-17s-20e, was at total depth at 3,023 ft. and was moving in rotary tools.

In Eddy County, Continental Oil Co. 1 Thurman-Federal, 11-16s-27e, was drilling shale and lime at 5,318 ft. It had the Tubb section at 4,380 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Eddy County: Harry Yates 1 J. W. Jones-State, 32-19s-27e, dry, TD 1,026 ft.

South Louisiana

Humble Stakes Location On 14,000-Ft. Test

NEW ORLEANS.—Humble Oil & Refining Co. has staked location for a proposed 14,000-ft. test, which if carried to contract depth, will be the deepest well ever drilled in Avery Island field, Iberia Parish. The well will be known as 26 Petit Anse Co., 37-13s-5e.

Approximately 1½ miles south of West Tepetate field, Jefferson Davis Parish, Callery & Hurt 1 Waggaman, 38-8s-3w, wildcat, has been abandoned at total depth of 9,763 ft. A slight show was reported by log at approximately 8,600 ft. Operators set 5½-in. casing at this depth and perforated at 8,614-22 ft. and found a flow of salt water.

No information has been released on late coring of Fidelity Oil & Royalty Co. 1 Edgewood Land & Mortgage Co., 18-6s-9w, prospective discovery in Beauregard Parish. Operator confirmed the report that sand was encountered at 8,543-56 ft. and on drill-stem test an unestimated amount of 36.9°-gravity oil was recovered.

At its St. Martin Parish wildcat test, Texas Pacific Coal & Oil Co. is running electric log in 1 Regis La Grange Account 1, 46-8s-6e, 5 miles east and 1 mile south of Arnaudville. Total depth of the well is 10,717 ft.

In Glenmora field, Rapides Parish, Pan Am Southern Corp. and Nemours Corp. 1 Crowell Land & Mining Corp., 3-2s-2w, has been abandoned at total depth of 10,357 ft., after running electric log. Top of the Wilcox was called at 8,314 ft.

In the same field, Texas Pacific Coal & Oil Co. 1 L. C. Branch, et al, Account 1, 26-1s-2w, is fishing for bit cones. Total depth of the well is 10,839 ft. Operator cored interval 10,595-645 ft. with recovery described as sand with slight oil shows, poor permeability.

The 17 new locations include 1 wildcat try in Avoyelles Parish. There were no successful exploratory wells completed,

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however three were reported dry, one each in Evangeline, Pointe Coupee, and Rapides parishes.

SOUTH LOUISIANA WILDCAT FAILURES

Evangeline Parish: Bates & Cornell 1 Alfred Young, 10-5s-2e, dry, TD 10,873 ft.

Pointe Coupee Parish: Bateman Drilling Co. 1 S. D. Cochran, 46-5s-8e, dry, TD 10,720 ft.

Rapides Parish: Harry B. Williams 1 J. B. Edwards, et al, 16-1s-2w, dry, TD 11,592 ft.

Texas Gulf Coast

Good Show of Condensate Recovered by Sun Oil Co.

HOUSTON.—Six miles north of Bellville in Austin County, Sun Oil Co. has had a good recovery of condensate at 1 Mikeska, S. F. Austin 4 League Grant. On drill-stem test of perforations at 9,742½-52½ ft., using ¼-in. top and bottom chokes, and 1,500 ft. water cushion, well flowed an estimated 50 to 60 bbl. of condensate Flowing pressure was 4,425 psi. Operator pulled tool and recovered 275 ft. of condensate with no salt water being encountered.

Oil production has been extended to the southeast of Goose Creek dome, Harris County, at Sun Oil Co. 2 Ashbel-Smith. Drilled to a total depth of 5,238 ft., the well was plugged back to 4,444 ft. and perforated for production at 4,202-12 ft. On potential test, the well flowed at the rate of 107 bbl. of 27.3°-gravity oil per day through 8/64-in. choke. Tubing pressure was 500 psi.

Two miles northeast of West Columbia in Brazoria County, Magnolia Petroleum Co. is running production packer at 1 James Griffith, wildcat located in James B. Bailey League, Abstract 38. Operator perforated from 11,201-21 ft. for drill-stem test, using ¼-in. chokes and 7,500 ft. of water cushion. The water cushion hit the surface in 8 minutes followed by gas and condensate. Surface pressure was 3,800 psi.

American Republics Corp. and Houston Oil Co. of Texas has run 5½-in. casing at approximately 7,300 ft. in its prospective discovery, 1 M. B. Hughes, et al, Jasper County. Latest perforations were made at 6,862-65 ft., however operations were shut down because of inclement weather. On previous drill-stem tests, good showings of oil were recovered at 6,857-61 ft., 6,992-99 ft., and 7,048-52 ft. Hole is bottomed at 8,103 ft. Location is in the southeast corner of Henry Webb Survey, A-42.

In Refugio County, perforations are being made in two zones at Kirkwood & Morgan, Inc., 1 C. H. Dean, wildcat test in Jose Maria Gregoria Cobian Survey, 2 miles southwest of Woodsboro. Tests will be made on basis of recovery from two drill-stem tests. First test was made from 2,720-23 ft. which recoverel dry gas through ¼-in. chokes, with flowing pressure of 1,193 psi. Second test was made at 2,812-15 ft. which also recovered dry gas through ¼-in. chokes, with flowing pressure of 1,217 psi. Total depth of the venture is 5,468 ft. with casing cemented at approximately 2,855 ft.

The 49 new locations include 11 wildcat starts, 1 each in Goliad, Karnes, Live Oak, Austin, Brazoria, Harris and Polk counties and 2 each in Liberty and Wharton counties. There were two successful exploratory wells completed, one each in Victoria and Wharton counties, while five were dry, one each in Goliad, Washington and Lee counties and two in Live Oak County.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Victoria County: Oil discovery—Kirby Petroleum Co. R. T. Buchanan, et al, Indiola RR Sur., Abstract 204, 2 mi. S-SE of Helen Gohlke field, TD 8,517 ft., perf. Wilcox 8,157-62 ft., IP: 274 bbl. oil per day, ¼-in. choke, TP 600 psi., 33.5° gravity.

Wharton County: New pay at Hutchins-Kubela—Adams & Haggarty 3 J. F. Kubela Estate, H&TC Sec. 4, A-660, North flank of field, TD 4,672 ft., perf. 4,668-71, IP: 113 bbl. oil per day, ⅛-in. choke, TP 635 psi., gravity 24.5°.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Goliad County: Ben D. Marks, Tr. 1 Bertha Wilkinson, J. Galaghan Sur., 2 mi. N of Berclair field, dry, TD 3,450 ft.

Lee County: Nails Creek Oil Co. 2 Seymour Sacks, Thos. S. Hinds League, 8 mi. NE of Giddings, dry, TD 4,696 ft.

Live Oak County: W. R. Quih 1 Miller, Bonham & Gayle, Dr. C. F. Simmons Nueces Valley Subd., E. Clavecker Sur., dry, TD 1,845 ft.

Washington County: Roy Willis Perkins 1 W. A. Boerninghaus, Henry Austin League, 9 mi. NW of Brenham, dry, TD 1,437 ft.

Ohio Fields

New Pool Indicated For Lorain County

COLUMBUS.—Indications of a new pool were found in Huntington Township, Lorain County. Ohio Fuel 1 G. C. Krueck, Lot 18, topped a sand at 2,583 ft. and gaged 265,000 cu. ft. of gas from 2,583-86 ft. The well was shut down for pipe.

Burtner, Morgan & Stevens 1 Charles Retzler, Lot 85, Lawrence Township, Tuscarawas County, made 725,000 cu. ft. of gas natural. After shot it made 850,000 cu. ft. and was shut in.

Two Newburg sand wells were drilled in in Harrisville Township, Medina County.

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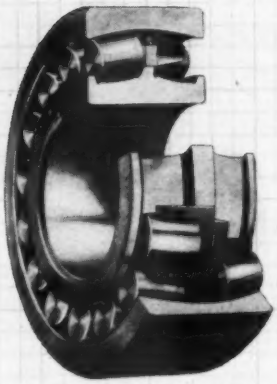

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Buck et al., 1 DeLong-Henry, Lot 8, showed 325,000 cu. ft. of gas at 2,695-2,730 ft., and will be shot. The well was drilled to the Clinton, which was dry, and plugged back. W. A. Hoey 3 John Amheiser, Lot 94, gaged 300,000 cu. fr. of gas natural and 900,000 cu. ft. after shot.

OHIO SUCCESSFUL WILDCAT

Coshocton County, New Castel Township: John Morrow et al., 1 E. O. Rodehaver, 2 qr., Clinton 3,083-3,125 ft., 40 bbl., TD 3,146 ft.

OHIO WILDCAT FAILURE

Huron County, Ripley Township: McManaway & Harmon 1 D. Silliman, Lot 25, Clinton missing, TD 1,965 ft.

North Central Texas

Drill-Stem Tests Point to Conglomerate Discovery

WICHITA FALLS.—Stonewall County was in line for another conglomerate discovery, based on drill-stem tests of a possible 39-ft. pay section, at Cities Service Oil Co. 1 Baitz, 2½ miles east of Old Glory.

Operators placed top of the pay at 6,004 ft., and reported a drilling break at 6,014-21 ft. A 2-hour test of the section had gas in 7 minutes and flowing oil by heads. When pipe was pulled, recovery was 1,620 ft. of oil and some oil-cut mud with no water. Flowing pressure ranged from 150-500 psi. Second test from 6,023-39 ft., open 2 hours, recovered 180 ft. of oil and 120 ft. of mud-cut oil. At last report it had been drilled ahead to 6,130 ft. and was in Mississippian chert. Casing was to be run for further tests.

Skelly Oil Co. 1 Dalby, east offset and confirmation well to new Canyon reef sand production southeast of Aspermont, recovered 200 ft. of oil and gas-cut mud on a 3-hour test at 4,212-90 ft. Operators were pulling core from 4,290-4,337 ft.

Deep Rock Oil Corp. has completed its 1 Cordova School Land, east offset to its Kiowa Peak Strawn sand discovery, for a pumping potential of 25 bbl. of 39°-gravity oil a day. Pay was from perforations at 5,185-89 ft.

Seaboard Oil Co.'s 1 Ollie Sparks, east offset to its Double Mountain Canyon reef discovery, has been abandoned at 6,458 ft., in Pennsylvanian lime and shale. According to reports, it was 20 ft. low to Seaboard's 1 Edwards.

In the northwest corner of Jack County, Texas-Canadian Oil Corp. 1-A M. M. Garrett has been plugged back from the Mississippian to attempt completion as a Strawn discovery. A drill-stem test from 3,135-45 ft. had developed some free oil. Top of the Mississippian was 5,716 ft. and total depth was 5,737 ft. There were no shows reported in the lower formation.

In northeast Parker County, Kingwood Oil Co. 1 Luedtke-Williams was showing for a ½-mile north extension to Caddo production. Casing perforations from 3,819-43 ft. returned about 1 bbl. of oil an hour on the swab, following acid treatment. Additional shots were placed from 3,862-72 and 3,877-86 ft.

In Trockmorton County, Cities Service Oil Co. 2-170 SMS Ranch, confirmation test to the 170 Swenson, perforated in the lower Caddo from 4,768-75 and 4,780-90 ft., and flowed 111.89 bbl. of oil in 24 hours through 22/64-in. choke. Testing was to continue.

In Clay County, Stephens Petroleum Co. 1 Bryant Edwards has plugged back from the Ellenburger for completion attempt from the upper Simpson. Top of the Ellenburger was 6,495 ft., drilled to 6,597 ft. with no shows. Top of the Simpson was 6,196 ft. A 1-hour test from 6,230-50 ft. had gas in 29 minutes and recovered 80 ft. of free oil. Location is 2½ miles northwest of nearest Simpson production.

In northwest Cooke County, Wilson Brothers Oil Co., Dallas, completed their 1 W. F. Solomon-West Ranch for a daily pumping potential of 84 bbl. of oil, from open hole at 2,382-90 ft. Location is northwest of Muenster and 1 mile northwest of nearest production.

Intex Oil Co. has completed its 1 Aud Gerrald as a Noodle Creek lime discovery 4 miles east of Rotan in Fisher County. Potential was 65 bbl. of 38°-gravity oil, on the pump, from perforations at 3,429-34 ft. The wildcat had been drilled to the Ellenburger, topped at 6,460 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Stephens County: Pardue & Hilgenberg 1 B. B. Cash, 36-6-T&P, 10 mi. SE Breckenridge, TD 1,843 ft., elev. 1,447 ft., sand pay perf. 1,818-16 ft., flowed 16 bbl. oil a day, 12/64-in. choke, TP 900 psi., 850 cu. ft.

Throckmorton County: Warren Oil Corp. 1 west Hamilton, Sec. 1,651, TE&L Sur., 6 mi. E Woodson, TD 4,562 ft., PB 3,765 ft., Caddo perf. 3,748-56 ft., flowed 814 bbl. 42°-gravity oil a day, 22/64-in. choke, TP 385 psi., GOR 319 cu. ft.

Wilbarger County: Dwight M. Ross et al 1 J. W. Walker, Rebecca Coleman Sur., 2½ mi. E Bridgeport, TD 5,658 ft., conglomerate 4,833 ft., pay 5,540 ft., flowed 76.6 bbl. 44°-gravity oil a day, 12/64-in. choke, TP 190 psi., GOR 1,930 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: L. T. Burns 1 R. J. Andrews, TE&L Sur. 2,437, 2½ mi. E Megargel, dry, TD 5,242 ft.

C. B. Christie 4 W. P. Ferguson, SPRR Sur., 2½ mi. NE Mankins, dry, TD 1,730 ft.

T. M. Weatherford 1 R. A. Crowell, E. G. Knight Sur., 10 mi. SW Wichita Falls, dry, TD 701 ft.

Continental Oil Co. 1 J. H. Thomas, 13-1-D&W, 1 mi. S Bomarton, dry, TD 6,176 ft., Mississippian 5,725 ft., Ellenburger 6,050 ft.

Clay County: Brown Drilling Co. 1 Humpert, 61-2-Clark & Plumb, 2½ mi. SE Windshorst, dry, TD 4,605 ft.

Coleman County: Luling Oil & Gas Co. 1

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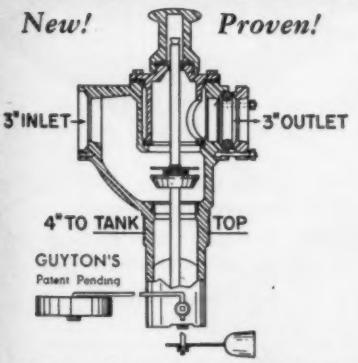

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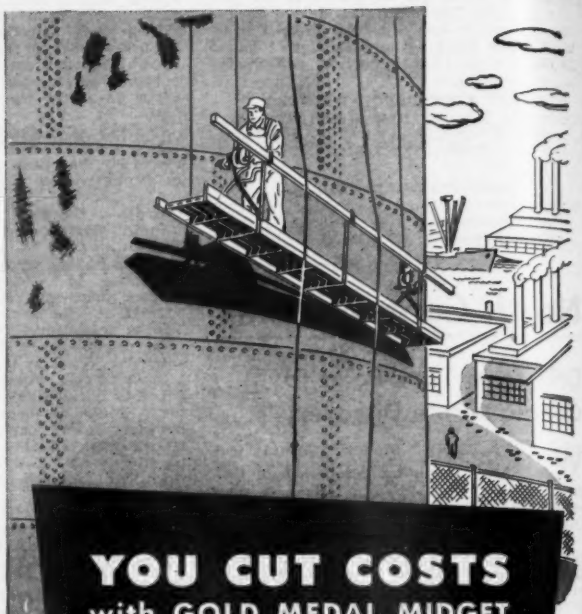

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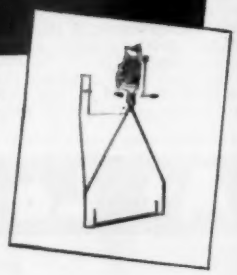

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W. H. Davis, Sec. 11, T&NO, 1 mi. W Glencove, dry, TD 3,611 ft., Jennings 3,401 ft., Gardner 3,453 ft., Gray 3,597 ft.

Cooke County: Sussex Oil Co. 1-E Hildebrand, 4 mi. NE St. Jo, dry, TD 2,400 ft.

Eastland County: Trumter Petroleum Corp. 1 W. H. Hughes, 17-2-ETRR, 5 mi. W Rising Star, dry, TD 1,849 ft. in sand.

Foard County: James F. Breuil 1 Beryl Dodson Self, 7-A-SPRR, 8 mi. W Crowell, dry, TD 4,670 ft., Canyon 4,610 ft.

Jack County: J. M. Hickey & Sons 1 Henry Cohen, SA&MG Sur., 10 mi. N Jacksboro, dry, TD 2,400 ft. in sand.

Cleo J. Wright 1 Alvin Clifton, Sec. 2, SPRR Sur., dry, TD 642 ft.

Jones County: Farris Oil Co. 2 J. H. Fry, Sec. 103, BBB&C Sur., 2 mi. SW Tuxedo, dry, TD 3,215 ft., Dotham 2,183 ft., Flippen 2,563 ft.

Hooker & DeMohrenschildt 1 C. H. Heald, 50-2-SPRR, 3 mi. W Anson, dry, TD 4,047 ft., elev. 1,786 ft., Hope sand 2,700 ft., Hardy sand 4,030 ft.

Montague County: S. D. Johnson 1 P. J. Martin, T. Puckett Sur., 6 mi. N St. Jo, dry, TD 2,549 ft.

Palo Pinto County: Ernest Loyd 1-B Mrs. Helen H. Johnson, CEPI&M Sur., 6 mi. W. Graford, dry, TD 2,410 ft.

Shackelford County: Taxman Oil Co. 1 F. B. Cloud, 38-11-T&P, dry, TD 4,740 ft., elev. 1,615 ft., Caddo 4,031 ft., Ellenburger 4,710 ft.

Wichita County: James S. Smith 1-B Douglas, Sec. 15, H&GN, 3 mi. SE Electra, dry, TD 2,002 ft.

Young County: An-Son Oil Corp. 1 Daws, TE&L Sur., 1 mi. NE Holbert Caddo field, dry, TD 4,110 ft.

C. B. Christie, Jr. 1 J. T. Sims, TE&L Sur., Blk. 629, near Jean townsite, dry, TD 3,204 ft.

Lewis-Hartley & Frank 1 S. C. Sahanafelt, Blk. 2, BBB&C Sur., 3 mi. NE Loving, dry, TD 477 ft.

Fred R. Harrell 1 I. E. Self, A. Rohus Sur., 4 mi. W Markley, dry, TD 720 ft.

Man & Bailey 1 A. C. Casey, Blk. 1,494, TE&L Sur., 1½ mi. W Farmer, dry, TD 3,950 ft.

Mississippi

Sinclair Wildcat Tests Gas in Lower Tuscaloosa

JACKSON.—Sinclair Oil & Gas Co. has set pipe and is preparing to test 1 R. T. Liddell, et al, 67-9n-1e, Jefferson County. This wildcat cored and drill-stem tested good shows of gas from the Lower Tuscaloosa "stringer" sand, but had no shows in the Massive. Electric log indicated approximately 14 ft. of net effective sand at 10,064-80 ft. which is 50 ft. below top of Lower Tuscaloosa. Total depth of the hole is 10,278 ft. and pipe was run to 10,135 ft. At last report, operators were waiting on cement.

In Clarke County, Alabama, James L. Duffy is making preparations to drill a 6,000-ft. wildcat test in NW NW 5-5n-5e, on acreage obtained from Smith County Oil Co.

Considerable interest has been aroused in the Thompson Creek area of southwestern Wayne County, Mississippi, when driller's top of chalk was reported at 4,427 ft. in Tip Ray-I. P. LaRue, Jr., 1 Gaines Sanderson, 31-7n-8w. If this is true, the well is approximately 500 ft. higher structurally than a dry hole located approximately 2½ miles to the northwest. At last report, the test was still drilling in chalk at 6,026. Unless the Eutaw section is encountered within the next few feet, this wildcat will be structurally normal to low instead of high.

At the second deepest test in the world, located in Stone County, Mississippi, George Vasen 1 fee, 9-2s-11w, at last report was coring at 19,885 ft. with no details being released. The world's depth record holder is Superior Oil Co. 1 Unit, Sublette County, Wyoming, which was drilled to 20,521 ft.

Continental Oil Co. 1 John R. Cameron, et al, 36-10n-1e, Madison County, is drilling in the Cotton Valley at 11,988 ft.

Lion Oil Co. is fishing at 9,090 ft. in 1 Denkmann, 22-7n-43, Rankin County. Total depth of the wildcat is 13,186 ft.

MISSISSIPPI WILDCAT FAILURES

Adams County: Ballew-Gulmon & Johns 1 Homochitto Lumber Co., 9-5n-1w, dry, TD 6,755 ft.

Adams County: Dan L. Reynolds 1 U. S. A., 20-5n-1w, dry, TD 6,875 ft.

Jefferson County: R. L. Lawrence - Lyle Cashion Co. 1 J. H. Williams Estate, 34-9n-1w, dry, TD 6,514 ft.

Eastern Texas

Sandusky Field Gets Ellenburger Extension

DALLAS.—Howell & Howell 1 Mulder, Ellenburger discovery or 2½ - mile southeast extension to the Sandusky field of Grayson County, was completed for 217 bbl. of 38°-gravity oil, flowing through 10/64-in. choke from perforations at 7,568-7,618 ft.

Pure Oil Co. 1 Rich, northwest of Sandusky production and separated by dry holes, was an apparent failure at 8,280 ft. in Oil Creek sand. A drill-stem test in the Oil Creek from 8,240-56 ft. recovered 1,450 ft. of oil and gas-cut water cushion, 450 ft. of slightly oil and gas-cut mud, and 3,300 ft. of salt water. The tool was open

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1 hour. Side-wall cores in the Pennsylvanian around 6,300-60 ft. recovered hard, tight sand with shows of dead oil.

Southwest of the Sandusky area, Sinclair Oil & Gas Co. 1 Jewell prepared to core from 7,425 ft., looking for top of the Oil Creek.

Olson Drilling Co. 1 Q. Little, Walker Survey and northeastern outpost on the field's northwest side, had mechanical trouble on a drill-stem test from 6,867-97 ft. and was pulling the testing tool.

An extension ½ mile southwest of Paluxy production in the Walter Fair field of Kaufman County was completed at C. H. Murphy & Co. 1 F. E. Lumpkin, B. S. Newman Survey. Potential, on the pump, was 144 bbl. of 31°-gravity oil a day from open hole at 4,930-50 ft. Top of the Paluxy was 4,925 ft. The field produces from the Paluxy and Woodbine.

A new Travis Peak exploration for Titus County was reported at J. Z. Werby, Longview, 1 Forest French, in the R. W. Mabers Survey about 5 miles south of Mount Pleasant. The Travis Peak is expected around 7,800 ft. and contract depth was 8,200 ft. Companies said to be supporting the venture included Atlantic Refining Co., Lion Oil Co., Delta Drilling Co., and Ohio Oil Co.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Falls County: J. E. Banks 1 C. G. Mitchell, Gregorio Basquez & G. Morgan Sur., 4 mi. W Perry, dry, TD 1,086 ft., Buda 1,064 ft.

Limestone County: Great Expectations Oil Corp. 1 J. L. Milburn, P. Varela Sur., ¼ mi. SE Tehuacana, dry, TD 3,113 ft., Austin 2,710 ft., Wodbine 3,010 ft.

G. T. Kimbell 1 Mary Wilson, P. Varela Sur., 3 mi. NW Springfield, dry, TD 806 ft., Nacatoch 770 ft.

Navarro County: W. T. Tramel 1 J. L. Johnston, H. H. Horn Sur., 1½ mi. NE Kerens, dry, TD 3,516 ft., Austin chalk 2,434-2,809 ft.

California

Cuyama Valley Gains in Field Drilling Activity

LOS ANGELES. — Cuyama Valley, relatively inactive for the past several months, is showing a slight increase in field drilling activity. Also two new wildcats are preparing to get under way.

In South Cuyama, there were eight rigs at work of which six were for Richfield Oil Corp.; at Russell Ranch, the same company had three wells under way. On the northern end, where three new discoveries were made last year, two rigs were at work in both Taylor Canyon (formerly Hancock area) and Morales Canyon.

At the southeastern end of the valley, Seaboard Oil Co. and Richfield have moved in a rig for a deep test about 4 miles northeast of South Cuyama production. The joint venture, 78-22 Kirschenmann, is in Section 22-10n-26w. It is about 1 mile north of the valley's deepest test, 1 Perkins, abandoned by Richfield at a total depth of 11,836 ft. Second test getting under way is Richfield's A-3 De Koch in Section 11-11n-29w. It will be the company's second test on Rancho Cuyama.

In the South Dome area of Tehama County, in Sacramento Valley, Buttes Oil Fields, Inc., was attempting to complete a new gas discovery about 4 miles south of the Corning gas field. The wildcat, in Section 25-24n-3w, made an unestimated flow of gas on a formation test at 1,530-60 ft. About 6 miles south of the Afton area in Colusa County, Honolulu Oil Corp. has staked location for a gas test, known as the Honolulu-Humble 1 Terhel Farms, in Section 35-18n-1w.

Possibilities for oil northwest of Coalinga field production, Fresno County, shortly will be tested by Walker & Pray 1 Domengine Ranch. Site has been staked in Section 29-18s-15e. South of Fresno about 2 miles, in Section 23-14s-20e, Mid-Cal Oil & Gas Co. was drilling below 2,000 ft. at its 1 Mid-Cal Suglian.

Shell Oil Co.'s deep-test wildcat, 130 Irvine, has reached a depth of 4,372 ft. The well is located just north of Newport Beach and is the first deep test in this locality.

A depth of 7,200 ft. has been reached in Standard Oil-U. S. Navy's well 347-31S. They are preparing to complete at this depth. In the same field, Standard Oil-Navy's well 338-35S is down to 6,990 ft., and preparations for completion are under way.

Jergins Oil Co.'s well, 1 Aurignac, at San Ardo, is drilling ahead at 1,548 ft.

Universal, Consolidated, will soon start drilling on Humble 54-31 at Cuyama.

D. D. Feldman is preparing to commence drilling on 85-8 B.V.A. in the Coles Levee field.

Nevada activity.—In Nevada, Black Gold Oil Co. reportedly has reached 1,000 ft. on its cable-tool test at the Arden Dome 16 miles southwest of Las Vegas. At that depth, the wildcat, 1 Golden Spike, was believed to be in an upper Pennsylvanian lime.

At Hayden Creek in White Pine County, the joint test of Standard Oil Co. and Continental Oil Co. was drilling below 1,634 ft. Located in Section 17-15n-59e, 1 Hayden Creek Unit is the operators' second attempt in northeastern Nevada. In Eureka County, at Sulphur Springs Range, George Hadley 1 "Well" reportedly was shut down after reaching a depth of about 100 ft. This wildcat is in Section 13-27n-52e.

CALIFORNIA WILDCAT FAILURES

Kern County, Ant Hill-Round Mountain area: International Exploration Co. 7 Linda, 2-29s-29e, dry, top Olcese 450 ft., top Vedder 2,912 ft., TD 3,023 ft., elev. 590 ft.

North Mountain View area: Havenstrite Oil Co. 1 Tyner, 2-30s-28e, dry, TD 5,813 ft., elev. 406 ft.

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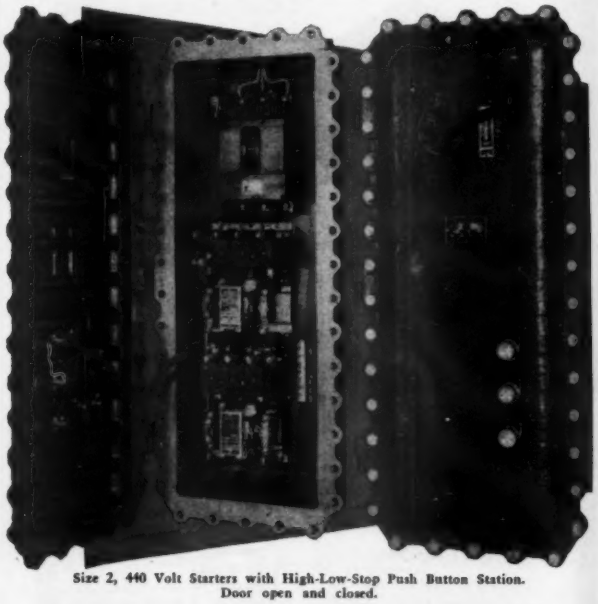
This starter is used for the control of two-speed motors in Class 1, Group D, Hazardous Locations. Outstanding features include: (1) Wide angle opening of swing door gives complete accessibility; (2) Extra wide flame paths on ground surfaces between cover and box insure safety; (3) Pan-mounted equipment can quickly be removed, providing maximum ease and space for pulling in wires; (4) Start-stop station and resets are mounted directly in cover; (5) Offered in sizes up to and including Size 3, 440 Volt, 50 H.P. You are invited to write for complete information.



Size 2, 440 Volt Starters with High-Low-Stop Push Button Station. Door open and closed.

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Manufacturers of: Explosion Proof Motor Controls, Junction Boxes and Enclosures, Circuit Breakers and Lighting Panels. Oil Field Motor Controls, Automatic Pipe Line Sampling Device, Cathodic Protection Equipment, Switchboards, Instrument and Control Panels, Unit Substations.

Tejon Flats area: Sunray Oil Corp. 14-14 Tejon Ranch, 14-11n-19w, dry, TD 6,293 ft., elev. 709 ft.

Orange County, Richfield area: D. D. Stewart 1 Stewart-White, 28-3s-9w, dry, TD 4,780 ft., elev. 290 ft.

San Benito County, Lonoak area: The Texas Co. 1 Eade (NCT 1), 12-19s-10e, dry, TD 7,255 ft., elev. 2,235 ft.

San Luis Obispo County, Estrella area: Standard Oil Co. 44-8 Cleary-Hillman, 8-25s-14e, dry, TD 3,850 ft., elev. 1,750 ft.

Santa Barbara County, Cuyama Valley area: Humble Oil & Refining Co. 1 K. E. Norris, 11-9n-25w, dry, TD 11,508 ft., elev. 2,704 ft.

Ventura County, Eureka Canyon area: Oceanic Oil Co. 1 Smith Canyon, 32-4n-18w, dry, TD 2,000 ft., elev. 856 ft.

Red Mountain area: Amerada Petroleum Corp. 1 R. C., 10-3n-24w, dry, TD 4,067 ft., elev. 1,060 ft.

Kansas

Forest City Basin Test Indicates New Oil Pool

SKELLY OIL CO. appears to have uncovered another Forest City Basin pool at its 1 Wolgast, SE NE SW 18-12-11e, Wabaunsee County, in the northeastern part of the state. With casing perforated at 1,674-85 ft. in the Kansas City lime section, the well produced at the rate of 2 bbl. of oil per hour in initial swabbing tests. Drilled to 3,168 ft. in Viola lime, it found no important showings in other potentially productive horizons below the present producing zone. Viola, the productive zone of most of the other Forest City Basin pools opened to date, tested fresh water. Casing seat is at 1,727 ft. Location of the new well is about 4 miles northeast of the Mill Creek pool opened the latter part of 1950 by the same company.

In the active northeastern Stafford County area in western Kansas, Lewis Drilling Co. has uncovered another productive spot at its 1 Sleeper, SW SW SE 22-22-11, 2 miles east of the Richardson pool. The well produced 60 bbl. of oil in a 6-hour swabbing test. Production is from the Conglomerate zone, topped at 3,579 ft. (—1,767 ft.) and drilled to 3,588 ft.

Continuing tests with additional zone opened and additional quantities of acid applied to the formation, Stanolind Oil & Gas Co.'s Viola lime discovery well, 1 Clark, C NE SE 35-32-23, in Clark County, in the southwestern part of the state, has shown considerable improvement in production. On one of its latest gages, the well flowed 143 bbl. of clean oil during a 24-hour period. Previously, the well had made some water. Original tests were with only 10 ft. of the zone opened by perforations at 6,566-76 ft. Since then, the zone has been opened an additional 6 ft. above and 10 ft. below the original interval. A total of 14,000 gal. of acid has been used. The discovery has been designated as the Ashland pool, it being about a mile south of the town of that name. It is 20 miles from nearest production.

Another prospective discovery well in western Kansas which Stanolind Oil & Gas Co. is testing has not been so successful so far. It is 1 Evers, NE NW NE 1-22-16, 3 miles east of Larned, in eastern Pawnee County. With casing perforated at 3,942-43 ft. in Arbuckle lime, the well flowed initially at the rate of 6 bbl. per hour, but the flow dropped quickly and for a 10-hour period it was at an average rate of only 1 bbl. of oil and 1 bbl. of water per hour. Hole now has been plugged back to test oil and gas showings encountered in the Lansing section, topped at 3,488 ft. (—1,510 ft.).

KANSAS SUCCESSFUL WILDCATS

Barton County: Hartman 1 Werner, SW NW NW 30-19s-11w, elev. 1,797 ft., pumped 347 bbl. oil per day from Lansing at 3,106-15 ft.. TD 3,400 ft., anhydrite 585 ft., Topeka 2,686 ft., Heebner 2,950 ft., Sooy 3,339 ft., Simpson shale 3,366 ft., Arbuckle 3,392 ft., opens Werner field.

Butler County: Gaty 1 Graham, SW SE NE 5-28s-3e, elev. 1,315 ft., 2,068 bbl. oil per day from Simpson at 3,070-72 ft., TD; Lansing 2,002 ft., Kansas City 2,340 ft., Mississippi lime 2,804 ft., Kinderhook 3,012 ft.

Ellsworth County: Continental Oil So. 1 Shumway, SW SW NW 10-17n-8w, elev. 1,675 ft., pumped 275 bbl. oil from Simpson at 3,158-67 ft., TD; Lansing-Kansas City 2,722 ft., Viola 3,121 ft., opens North Edwards field.

Kingman County: Laura Jane 1 Seward, SE SE SE 4-28s-5w, elev. 1,421 ft., flowed 148 bbl. oil per day from Mississippian at 3,814-17 ft., TD; anhydrite 410 ft., Lansing-Kansas City 2,989 ft., Mississippi chert 3,758 ft., Mississippi cherty dolomite 3,793 ft.

Phillips County: Marmad Oil Co. 1 Artz, SE NW NE 19-1s-18w, elev. 2,179 ft., pumped 24 bbl. oil per day from Lansing at 3,456-58 ft., TD 3,510 ft., anhydrite 1,765 ft., Heebner 3,345 ft., opens Artz field.

Stafford County: El Dorado 1 Sheppard, SE SE NW 16-22s-11w, elev. 1,797 ft., pumped 58 bbl. oil per day from Arbuckle at 3,548-83 ft., TD; anhydrite 510 ft., Heebner 3,043 ft., Lansing-Kansas City 3,201 ft., Sooy 3,478 ft.

Wabaunsee County: Carter Oil Co. 2 Woodbury, SE NW NE 11-15s-10e, elev. 1,457 ft., 108 bbl. oil per day from Viola at 3,223-28 ft., TD 3,335 ft., Lansing-Kansas City 1,562 ft., Mississippi chert 2,587 ft., Mississilli lime 2,596 ft., Kinderhook 2,926 ft., Hunton 3,073 ft., Maquoketa 3,152 ft., Decorah 3,302 ft., Simpson sandy dolomite 3,316 ft., St. Peter 3,330 ft.

KANSAS WILDCAT FAILURES

Barton County: Brooks Pierce 1 Eveleigh, NW NW SW 16-18s-13w, elev. 1,806 ft.,

(Continued on page 161)

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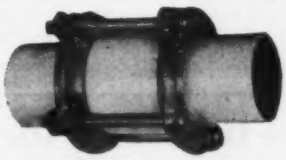

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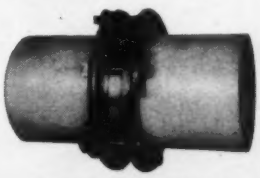
BAND CLAMP

Style 77B, for repairing small leaks and holes in the run of pipe.

SPLIT REPAIR CLAMP

Style 79B, for repairing pitholes and longitudinal splits in pipe.



POROUS-WELD CLAMP

Style 55, for repairing circumferential weld leaks.

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Appalachian Field

Cabot, Inc., Brings in Gas Well in Cameron County

PITTSBURGH. — In North-central Pennsylvania, Godfrey L. Cabot, Inc., completed 1 Pardee Estate, in Gibson Township, Cameron County, located on the Driftwood Quadrangle, at 6,789 ft., elevation 1,616 ft., for 152,000 cu. ft. of gas after shot. It was originally drilled in 1947 to a depth of 3,187 ft. and was deepened, reaching the Onondaga lime at 6,719 ft., Oriskany sand 6,751-6,785 ft. No new locations or other completions were reported in this area.

In the Mountain Lake Park area, Garrett County, Maryland, work has been started at three new locations—all being drilled by local operators. No. 1 Kite is now building rig. Rig is on the ground at Nollem Oil & Gas Co. No. 1 A. D. Nailer. Western Maryland Gas Co. No. 1 Dawson (Lots) is building rig. No completions were reported.

In southwestern Pennsylvania, Unity Township, Westmoreland County, Peoples Natural Gas Co. completed rebuilding the rig after the recent fire at 1-3921 Fred Musnug, elevation 2,100 ft., and fishing operations for the wire line and tools are under way. The depth of the hole is 7,856 ft. In Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is down to 8,872 ft.

Five new locations in southwestern Pennsylvania were reported during the past week: Madison Township, Armstrong County; Limestone Township, Clarion County; Beaver Township, Jefferson County; Somerset Township, Washington County; and Washington Township, Westmoreland County.

In Steele district, Wood County, West Virginia, Davis-Kelly Oil & Gas Co. 1 Charles D. and Audrey Post, elevation 847 ft., resulted in a dry hole. Corniferous lime found at 4,850 ft., Oriskany sand from 4,965-97 ft., gas at 4,967 and 4,987 ft., 73,000 cu. ft. Total depth was 5,002 ft. The well will be plugged and abandoned. United Fuel Gas Co. 6651 Ralph Ayers, elevation 951 ft., topped the Oriskany sand at 5,205 ft. Gas was found at 5,219-35 ft., testing 2,363,000 cu. ft., and blowing down to 1,831,000 cu. ft. Hole is at 5,235 ft. In Tucker district, Wirt County, Louis E. Reed 1 Earl Tanner, elevation 1,050 ft., is shut down at 5,795 ft. Oriskany sand was found from 5,767-94 ft., with gas from 5,770-75 ft., which tested 59,000 cu. ft. The well will be shot.

Eleven new locations in West Virginia were reported during the past week: Otter district, Braxton County; Harts Creek district, Lincoln County; Harvey district, Mingo County; Buffalo district, Putnam County; Grant and Lincoln districts, Wayne County; and Harris district, Wood County.

WEST VIRGINIA WILDCAT FAILURE

Wood County, Steele district: Davis-Kelly Oil & Gas Co., 1 Charles D. & Audrey Post, elev. 847 ft., dry, Corniferous lime 4,850 ft., Oriskany sand 4,965-97 ft., show of gas 4,967 ft. and 4,987 ft., TD 5,002 ft. Will be plugged and abandoned.

Oklahoma

Viola Production Opened At Southeast New Hope

FIRST Viola lime production for the Southeast New Hope pool, Garvin county, has been established by Kerr-McGee Oil Industries, Inc., at its 1 Alta, C SE NW 11-4n-3w. The well, located on the east side of the pool, initially at the rate of 7½ bbl. of oil per hour through ¼-in. choke, and then made 142 bbl. in 24 hours through the same sized choke. Tubing pressure gaged 600 psi. Production in the pool is mainly from Gibson sand.

Top of the Viola was marked at 7,123 ft. Production is from casing perforations opposite a zone at 7,530-70 ft. Previously tested was the third Bromide sand, opposite which casing was perforated at 7,940-60 ft. From that zone, the well flowed 104 bbl. of 63° distillate and 4,200,000 cu. ft. of gas in 23 hours through ½-in. choke. While testing the Viola, the third Bromide was sealed off by a bridge plug set between the two zones. Total depth of the hole is 8,005 ft. with 7-in. casing at 7,998 ft.

Production of the Eola pool in the same county has been extended eastward with a good well being completed by Anderson-Prichard Oil Corp. at 1 Crane-State, SE SW NW 16-1n-2w. With casing perforated at 9,990-10,048 ft. opposite the lower Bromide sand, topped at 9,944 ft., the well flowed 692 bbl. of oil in 18 hours through 1-in. choke on the tubing. McLish sand, which also produces in the pool, was found dry. It was drilled from 10,095 to 10,618 ft. Casing was run to 10,152 ft. in that formation.

Republic Natural Gas Co. also is completing a small well about ½ mile northeast of production where it has gone back into an old hole, formerly abandoned as dry, and perforated casing opposite Bromide sand at 8,972-88 ft. The zone was given a hydrafrac application, and at latest report the well was flowing from 12 to 15 bbl. of oil per day. The well is 1 Harman heirs, SE SW SE 8-1n-2w. It had been drilled to a total depth of 9,286 ft. Casing is at 9,167 ft.

An outpost discovery has been made by Dick Wegener in Grady County. His 1 Todd, SW SE SE 1-3n-6w, approximately ½ mile southwest of nearest production at the north end of the Knox pool, yielded 1,080 ft. of clean oil following a 2-hour drill-stem test of a sand at 4,722-74 ft. In the test, the well had a fair gas flow, starting within 30 minutes after the tester was opened. Flow pressure gaged 250 psi. When the well was shut in, pressure built up to 1,350 psi. within 15 minutes. Hole was deepened to 4,865 ft. but no important showings were obtained below the above zone. Casing has been run to 4,840 ft.

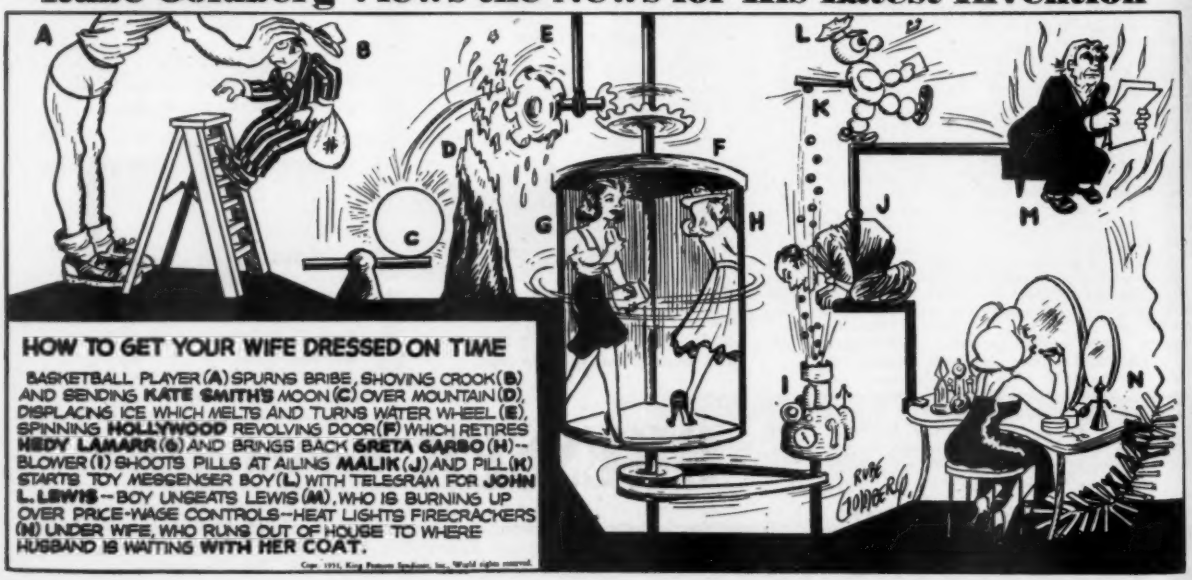
The promising Simpson dolomite discovery well drilled by T. W. and J. M. Loffland, Jr., southwest of the Broyles pool, 3 miles east of Ripley, Payne County, flowed 135½ bbl. of clean oil on a 20-hour initial run through 16/64-in. choke after running tubing. Testing through other sized chokes is under way. The well is 1 Stanolind-Amerada. Location is NE SW SW 27-18n-4e. Before tubing was run, the well had tried to blow out and flowed nearly 200 bbl. in a 5-hour period before being killed.

OKLAHOMA SUCCESSFUL WILDCATS

Lincoln County: Biffle 1 Way "B," NE NE SW 19-12n-6e, pumped 290 bbl. oil per day from Hunton at 4,420-50 ft. and 80 bbl. oil from Wilcox at 4,678-87 ft., TD; Checkerboard 2,407 ft., Wewoka 2,650 ft., Wewoka sand 2,675 ft., lower Wewoka sand 2,957 ft., Big lime 3,310 ft., Oswego 3,380 ft., Prue sand 3,385 ft., lower Prue sand 3,500 ft., Inola 3,780 ft., Bartlesville sand 3,710 ft., lime 3,925 ft., Booch 3,975 ft., Mississippi Caney 4,040 ft., false Mayes 4,140 ft., Mayes 4,220 ft., Woodford 4,375 ft., Chimney Hill 4,460 ft., Aylvan 4,512 ft., Viola 4,610 ft., extension to West Prague.

Major County: Wilco Producting Co. 1 Smith, NE NE NW 9-21n-10w, flowed 120 bbl. oil per day from Manning at

Rube Goldberg Views the News for His Latest Invention



HOW TO GET YOUR WIFE DRESSED ON TIME

BASKETBALL PLAYER (A) SPURNS BRIBE, SHOVING CROOK (B) AND SENDING **KATE SMITH'S** MOON (C) OVER MOUNTAIN (D), DISPLACING ICE WHICH MELTS AND TURNS WATER WHEEL (E), SPINNING **HOLLYWOOD** REVOLVING DOOR (F) WHICH RETIRES **HEDY LAMARR** (G) AND BRINGS BACK **GRETA GARBO** (H)—BLOWER (I) SHOOTS PILLS AT AILING **MALIK** (J) AND PILL (K) STARTS TOY MESSENGER BOY (L) WITH TELEGRAM FOR **JOHN L. LEWIS**—BOY UNBEATS LEWIS (M), WHO IS BURNING UP OVER PRICE-WAGE CONTROLS—HEAT LIGHTS FIRECRACKERS (N) UNDER WIFE, WHO RUNS OUT OF HOUSE TO WHERE HUSBAND IS WAITING **WITH HER COAT.**

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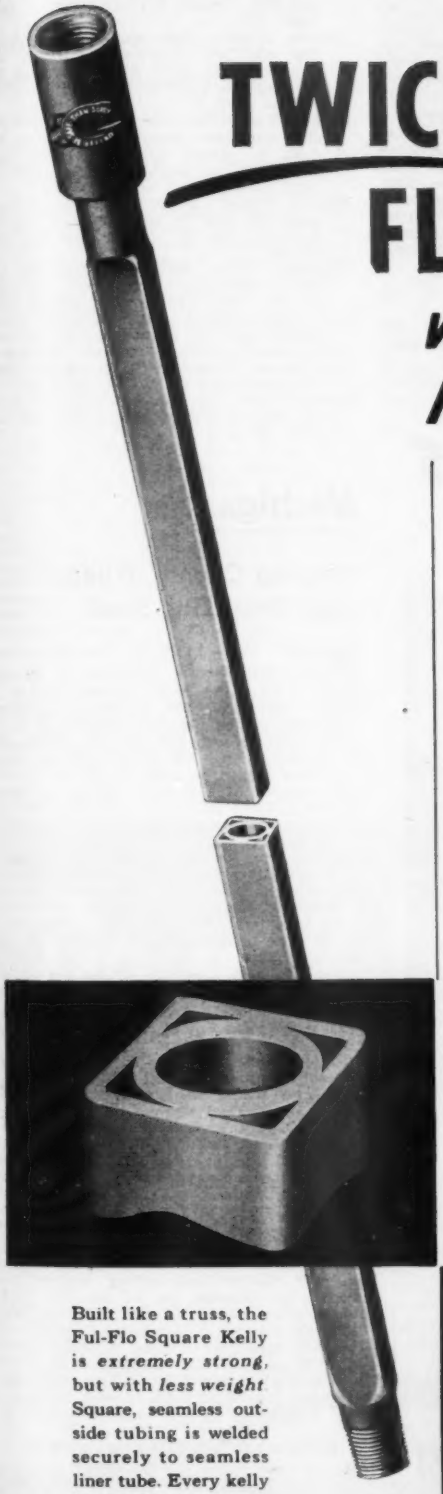

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- Greater stability and perfect balance reduce wear on related drilling equipment.

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GUIBERSON

6,840-6,914 ft., TD 7,229 ft., extension to Ringwood.

Muskogee County: Robertson & Viersen 5 McKee, NE NE NE 18-13n-16e, flowed 15 bbl. 45°-gravity oil per day from Hunton at 2,586-96 ft., TD 2,689 ft., Booch 1,050 ft., Dutcher 1,892 ft., Wapanucka 2,021 ft., Mississippi lime 2,355 ft., Viola 2,638 ft., dolomite 2,666 ft., Wilcox 2,675 ft., OWDD, new pay in Council Hill.

Osage County: Hughes 1 Osage, SE SE SW 19-21-12e, pumped 11 bbl. oil per day from Tucker at 1,572-80 ft., TD; Bartlesville 1,373 ft., sand 1,389 ft., new pay in Flat Rock.

Seminole County: Birmingham & Bartlett 1 Gragg "A," SW SE SE 13-11n-7e, elev. 937 ft., pumped 33 bbl. 37°-gravity oil per day from Cromwell at 3,376-82 ft., TD 3,751 ft., Earlsboro 3,020 ft., Booch 3,488 ft., Gilcrease 3,556 ft., second Cromwell 3,740 ft.

OKLAHOMA WILDCAT FAILURES

Atoka County: Atoka Oil & Gas 1 McNeill, NW SE NW 17-4s-11e, dry, TD 4,042 ft., elev. 600 ft., Basal Cretaceous 330 ft., Caney 925 ft., Mayes 1,190 ft., Woodford 1,485 ft., Sylvan 1,912 ft., Viola 2,089 ft., bromide 2,485 ft., McLish 2,750 ft., Oil Creek 3,210 ft.

Canadian County: Olson Drilling et al 1 Theimer, C SW NW 6-10n-5w, elev. 1,289 ft., dry, TD 10,208 ft., sand 5,050 ft., 5,321 ft., and 5,421 ft., Avant 6,190 ft., Dewey 6,340 ft., Checkerboard 7,554 ft., Oswego 8,364 ft., Mississippi lime 8,933 ft., Woodford 9,001 ft., Hunton 9,103 ft., Haragan 9,200 ft., Sylvan 9,628 ft., Viola 9,754 ft., sand 10,153 ft., first Wilcox 10,186 ft.

Creek County: Jackson et al 1 Trent, NE SW SW 11-18n-8e, dry, TD 2,651 ft.

Hughes County: Roodhouse 1 Norvell, NE NE SE 18-5n-11e, dry, TD 3,460 ft., lime 2,473 ft., Booch 3,183 ft., Atoka 3,234 ft.

Jefferson County: Jennings 1 Eakin, E/2 NE NW 1-7s-4w, dry, TD 1,953 ft., sand 1,901 ft.

Lincoln County: Garr-Wooley 1 Reynolds, SW SW NW 27-14n-5e, est. elev. 961 ft., dry, TD 4,771 ft., Prue 3,580 ft., Bartlesville 4,030 ft., Hunton 4,664 ft., Sylvan 4,760 ft.

Logan County: Carlock 1 Perdue, SW SE SW 24-19n-4w, elev. 1,051 ft., dry, TD 5,350 ft., Avant 4,153 ft., middle Layton 4,702 ft., lower Layton 4,872 ft., sand 5,240 ft., Big lime 5,288 ft.

Murray County: Dennis & Dalay 1 Postoak, NW NW SE 35-2n-3e, dry, TD 765 ft., sand 384 ft., 410 ft., 550 ft., and 620 ft.

Okfuskee County: Ellison 1 Burke, NE NE NE 17-13n-9e, elev. 795 ft., dry, TD 4,103 ft., Red Fork 2,535 ft., Bartlesville 2,825 ft., lime 2,986 ft., Dutcher 3,325 ft., Union Valley 3,382 ft., Cromwell 3,391 ft., Pitkin 3,414 ft., Caney 3,430 ft., Woodford 3,885 ft., Hunton 3,908 ft., Sylvan 3,928 ft., Viola 4,004 ft., Wilcox 4,061 ft.

Payne County: Hanlon-Boyle, Inc. 1 Sims est., SE SE NW 14-18n-5e, elev. 837 ft., dry, TD 3,272 ft.

STURDYBILT Houses pre-tested for 30 YEARS

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Michigan

Mecosta County Wildcat Logs Stray Gas-Sand

MOUNT PLEASANT.—A possible stray gas sand was in evidence at Mercer Oil Co., Inc., and Smith Petroleum Co. 1 Soper, NW SW SW 13-16n-10w, Green Township wildcat, Mecosta County, a projected Dundee oil test to the northeast of Paris-Traverse oil pool. Top of stray sand was logged at 1,325 ft. and gas show was reported at 1,335-42 ft. On a drill-stem test at 1,328-42 ft., with tool open for 45 minutes, recovery was 196 ft. of heavy gas-cut mud and 302 ft. of gas-cut water. It appeared possible that packer had not been seated properly and that if a good shut-off had been effected, gas might have shown in some quantity at the surface. Hole was cased with 7-in. casing at 1,641 ft. in preparation for standardization before being drilled ahead.

Earlier announced plans to test a Traverse oil show at W. B. Darke's 1 Bergelin, SE SW NW 3-14n-7w, Wheatland Township wildcat, Mecosta County, were changed and hole is being drilled on to the Dundee. If this lower objective fails to show for commercial completion, well will be plugged back and tested in the Traverse where 300 ft. of free oil showed in 10 hours at 3,307-11 ft. Top of Traverse was logged at 3,225 ft. After wildcat had been drilled ahead and was nearing Dundee, hole was reported to be carrying from 1,100 to 1,800 ft. of fluid, mostly oil, and showing considerable gas. A cavy hole forced operator to run 5-in. casing at 3,703 ft. on top of Bell shale before drilling into the Dundee.

Sun Oil Co. abandoned plans to deepen its first Skeels field offset, which was dry in the Dundee, on to the Richfield. Sun 1 Smith et al., NE NE NW 31-20n-2w, Sherman Township, Gladwin County, the diagonal southeast 10-acre offset to Don Rayburn 1 Cassidy flowing well, was bottomed out dry at 3,983 ft. Top of Dundee lime was logged at 3,822 ft. and the dolomite, with no oil shows, came in at 3,967 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Ganges Township: Ford Oil Co. 1 Bushee, SW NE SE 33-2n-16w, Traverse 1,193 ft., dry, TD 1,215 ft.

Oceana County, Hart Township: Mercer Oil Co., Inc., 1 Webb Comm., NW SW SW 6-15n-17w, Monroe 2,285 ft., dry, TD 2,289 ft.

Van Buren County, Pine Grove Township: Merrill Drilling Co. 1 Buis, NW NW NE 29-1s-13w, Traverse 1,332 ft., dry, TD 1,335 ft.

Rocky Mountain

Cold Weather Fails to Hamper Developments

DENVER.—Weather as cold as 40° below zero hindered Rocky Mountain operations in several areas, but the number of new locations for pool wells continued at a record high, and the majority of rigs were running in the region. Important new discoveries since the first of the year in Wyoming, Utah, and the Denver-Julesburg of Colorado and Nebraska, will apparently call for an increased wildcat campaign starting soon in these areas.

The most important discovery has been California Co.'s 1 Unit, NE NE NE 26-7s-23e, in the Red Wash area, Uintah County, Utah. This well flowed 512 bbl. of oil in 24 hours through ¼-in. choke with 410 psi. tubing pressure. Production is from a fractured zone in the Green River formation (Tertiary) between 5,160-5,270 ft. After drilling plug, the operator ran a swab five times and the well started to flow. Gas-oil ratio on the test was approximately 1,000 cu. ft. per barrel. This discovery may indicate a large productive area along the east side of the Uintah basin, east of previous deep basal Green River production found at Roosevelt and Gusher. Production in these fields was established around 9,000 ft., as compared with the 5,270-ft. depth at Red Wash. Production problems have been encountered in each of these fields, as the oil congeals at around 90°. California has run a circulating hot oil string to around 2,000 ft. in the annular space to aid in production. The oil has a very high paraffin content and cannot be run in Salt Lake Pipe Line Co.'s (Standard of California) nearby crude line from Rangely field to Salt Lake City.

A new pay discovery of interest was made by Continental Oil Co. in the Frontier sand at 16 Unit, NW NE SE 19-57n-99w, an extension in South Elk Basin field, Park County, Wyoming. The well made oil on drill-stem test in the Peay (basal Frontier) topped at 5,114 ft., and the operator has run casing to complete the well. Previous Frontier wells, high on structure, have produced gas, and the present well indicates an oil ring around the gas in that zone. Continental established production in the Tensleep in this field 5 years ago. It is of particular interest because of the high recovery of oil from the Frontier in Elk Basin field proper.

In western Nebraska, Stanolind Oil & Gas Co. announced location for another wildcat in the Harrisburg area at 2 Lovercheck-State, C SW SE 17-18n-55w, 1 mile from a recent failure and 3 miles southeast of the Kerr-McGee, Phillips, and Stanolind Meade well that showed oil on drill-stem test. Ohio Oil Co. will start at 1 Beyer, NW NW SE 19-14n-49w, in the north Sidney area, Cheyenne County, and H. L. Rogers and B. B. Carter have located their 1 Bright, SW SW NW 2-13n-50w, in the South Sidney area.

COLORADO WILDCAT FAILURE

California Mesa, Montrose County: McLaughlin et al., 1 Rhodes, C NE NE 22-50n-11w, TD 600 ft., dry.

UTAH WILDCAT FAILURE

Farmington, Davis County: Carbon Drilling Co. 1 fee, SW SW SW 26-3n-1w, TD 3,525 ft., dry.

NORTHERN NEW MEXICO WILDCAT FAILURE

McKinley County: Locke-Taylor 1B Santa Fe Pacific, NW NE NW 14-17n-9w, TD 1,900 ft., dry.

WYOMING WILDCAT FAILURE

Sussex, Johnson County: Continental Oil Co. 50 Unit, NW NE NE 14-42n-79w, TD 7,616 ft., dry, Teapot 2,872 ft., Parkman 3,163 ft., Steele 3,657 ft., Sussex 4,152 ft., Shannon 4,676 ft., Niobrara 5,967 ft., first Wall Creek 6,541 ft., second Wall Creek 6,892 ft., Muddy 7,625 ft., Dakota 7,797 ft., Lakota 7,874 ft.

Illinois-Ind.-Ky.

Gibson County Wildcat Revives Abandoned Area

THE old, abandoned oil and gas producing area located about 1½ miles west of Oakland City and south of what is now the St. Francisville pool in Gibson County, Indiana, is being revived with a prospective Cypress sand discovery by J. C. Haynes and Nathan Berkman. These operators' 1 Gilvie & McDowell, SW SE NW 23-2s-9w, found good saturation in the Cypress, logged at 1,462-71 ft., and following a 60-minute drill-stem test of the interval from 1,461 ft., had 1,000 ft. of gas, 650 ft. of clean oil, and 90 ft. of oil-cut mud in the pipe. Bottom of the hole still is in the pay, with no indication of water. Casing had been run to 1,460 ft. Location of the well is about ½ mile east of the former production.

The newly discovered Hord pool, located 7 miles north of Louisville in northern Clay County, Illinois, seems assured of a second good producer. It is W. C. McBride 1 Connerly, NE NW SE 14-5n-6e, a south offset to the discovery well, completed early in January by Ashland Oil & Refining Co. It has good saturation in both the Aux Vases sand at 2,712-27 ft. and the Rosiclare lime at 2,798-2,804 ft. Casing has been cemented on top the deeper zone, which will be tested with open hole. An alloy section was run in the casing string

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opposite the Aux Vases. A 60-minute drill-stem test of the Rosiclare had a substantial gas showing and yielded 2,440 ft. of clean oil with an additional 50 ft. of oil-cut mud. Both zones will be new pays for the pool, since the discovery well produces from the deeper McClosky lime, which it had at 2,810-18 ft.

Barron Kidd's prospective discovery well located ½ mile east of production in the St. Wendells East pool, Vanderburgh County, Indiana, is being put on the pump after swabbing tests in which it made an average of 7 bbl. of oil per hour natural. It is 1 Harris, SW SE SW 18-5s-11w, about 2 miles south of the town of St. Wendells. Production is from O'Hara lime at 2,652-62 ft.

The same operator has another prospective oil discovery in Edwards County, Illinois, where his 1 Cowling, NW SE SE 4-1s-14w, swabbed at the rate of 8 bbl. per hour natural in initial tests of its O'Hara pay zone at 2,987-92 ft. This discovery, located northeast of Bone Gap and about 4 miles southeast of West Salem, is about 2 miles from nearest production, the Bone Gap pool to the west.

Howard D. Atha 1 Delap, SE SW NW 8-7s-8e, 3 miles northwest of Omaha, in White County, Illinois, swabbed 15 bbl. net oil with about 65 bbl. of water per day while testing Cypress sand at 2,625-31 ft. It is about ½ mile north of the same operator's 1 Johnson, SW SE SW 8-7s-8e, another semi-wildcat now being put on the pump after swabbing tests. The area is southwest of the Roland pool and north of production in the West Omaha pool.

ILLINOIS SUCCESSFUL WILDCATS

Wayne County: J. M. Zanetis 1 Daubs, NE NE NE 31-1n-9e, IP 218 bbl., lower O'Hara 3,234-48 ft., and McClosky 3,278-84 ft., TD 3,306 ft. (new pool).

White County: Hinkle Drilling Co. 1 Horton, NW NW SE 19-3s-11e, IP 30 bbl., Rosiclare 3,067-73 ft., TD 3,183 ft., (extension Phillipstown Consolidated pool).

ILLINOIS WILDCAT FAILURES

Iroquois County: Don Baines 1 King Heirs, S½ NW NE SW 16-28n-10e, dry, TD 534 ft.

Madison County: H. E. Livermore 1 Sugie, SE NW SE 4-5n-6w, dry, TD 601 ft.

White County: G. C. Shoonmaker 1 Desper, SW NW SW 30-5s-10e, dry, TD 3,186 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: J. C. Miller-Ashland Oil & Refining Co. 1 Hart, NE NE SE 17-O-31, dry, TD 1,581 ft.

Henderson County: Ellis-Morrison-Damron 1 Clark-Gilmore, NW SE SW 1-P-25, dry, TD 2,234 ft.

EASTERN KENTUCKY

ASHLAND.—In Ida May pool of southern Lee and northern Owsley counties, Lick Branch Oil Co. has completed 1 Newman heirs located on Duck Fork Creek for 26 bbl. of oil daily from Corniferous lime topped at 1,014 ft. Total depth is 1,091 ft.

In Greenup County, 3-Y-79, Dixie King Oil & Gas Co. 1 Wain Boggs is shut down at 610 ft. pending decision to deepen after testing the Berea sand. The well made a small amount of oil but not enough for commercial production.

In Breathitt County, and located on Laurel Fork of Springfork Creek United Carbon Co. has a dry hole at 1689 E. J. Evans fee. The well went to 1,695 ft. after testing a barren Weir sand.

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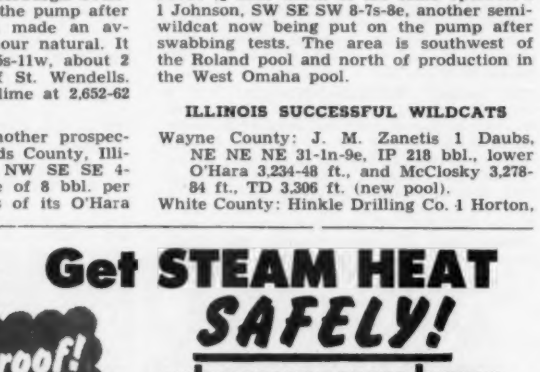

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Canadian Fields

Two Central Alberta Tests Find Encouraging Shows

CALGARY.—Two current operations in the Acheson-Stony Plain area of central Alberta have received encouragement in the form of oil showings and natural gas before reaching their D3 Devonian major objectives. One found 540 ft. of oil in the Basal Cretaceous, while the other found 210 ft. of oil in the D1 zone of Devonian plus a substantial natural gas flow in the Cretaceous during drill-stem tests. The Cretaceous oil show was obtained at Imperial Oil, Ltd.'s Stony Plain 3 well. The Devonian oil and Cretaceous gas find was at Albercan Oil Corp.'s Spruce Grove 1, exploratory test.

Imperial-Stony Plain 3, in LSD 11, 22-52-26w4, is located about ⅝ mile northeast of Imperial's D3 Devonian oil discovery, and 1¼ miles south-southeast of Central Leduc-Wild 1, D3 oil well. A 1-hour drill-stem test of the Basal Cretaceous interval at 4,099-4,132 gt. gave a faint blow, plus a recovery of 540 ft. of oil, 90 ft. of drilling mud, 90 ft. of oil and gas-cut mud, and 180 ft. of salt water. The hole is now heading down for lower objectives.

About 3¾ miles northwest of Imperial 3 is Albercan-Spruce Grove 1, in LSD 16, 23-52-27w4. The D1 Devonian zone was topped at 4,552 ft., or 2,194 ft. subsea. A drill-stem test at 4,545-63 ft. gave a slight gas blow to the surface, with maximum flow rate of 30,000 cu. ft. daily, plus pipe recovery of 210 ft. of oil. The Basal Cretaceous tests run at the Spruce Grove well are as follows: a 62-minute test from 4,203-18 ft. gave a gas blow to surface at the rate of 3,500,000 cu. ft. daily, plus a recovery of 105 ft. of salty water; a test from 4,242-76 ft. gave a gas flow rate of 300,000 cu. ft. daily and recovery of 90 ft. of mud.

Another oil extension has been recorded in the South Woodbend-North Leduc area, ½ mile from previous production. The new strike, which assured oil production from both the D2 and D3 zones of Devonian, was made by Bay Petroleum Corp. on a 40-acre parcel of Crown Reserve lease that

was purchased from the Alberta Government last August for a cash bonus of $58,665.15 plus a 15 per cent royalty bonus in addition to the normal crown royalty. The well is Bay-Woodland 5, in LSD 3, 31-50-26w4, ½ mile southwest of Bay 3 and 4, D3 and D2 oil wells. The new well topped the D2 at 4,775 ft., or 2,675 ft. subsea, and found oil present; cored into the D3 at 5,079 ft. or 2,979 ft. subsea. D3 cores showed good oil saturation, and the contact was 41 ft. above the water line. The crew is now preparing to run string of production casing for completion as a D3 producer.

Western Leaseholds, Ltd. and Dome Exploration (Western), Ltd. have joined for an exploratory venture in southeast Alberta, about 48 miles east of Big Valley oil field and 54 miles northeast of the Drumheller oil discovery. The well is located on a 17,000-acre spread of Crown leases that was farmed out from Glen M. Ruby & Associates of Salt Lake City. The new wildcat is Western-Dome-Thelma 21-26, in LSD 16, 21-34-12w4, located about 6 miles north of Spondin railpoint and 14 miles southwest of Coronation town. It will be a test down to and including the Devonian, with probable completion depth around 5,000 ft.

The thirty-eighth oil success at Joseph Lake, marking ½-mile extension on the east central side of the field, was recorded when a drill-stem test at Superior-Joseph Lake 59 flowed oil to the surface from the Viking sand. The Jo Lake project is owned by Superior Oils, Ltd., General Petroleums of Canada, Ltd., Kroy Oils, Ltd., Jupiter Oils, Ltd., and Imperial Oil, Ltd. This last success, in LSD 4, 24-50-22w4, ¼ mile north of the operators' 14 producer, ran a drill-stem test from 3,271-77 ft. and received a flow of natural gas with maximum rate of 324,000 cu. ft. daily, plus a flow of oil in 66 minutes. The well was allowed to flow about 9 minutes. When pipe was pulled, after pumping most of the oil from the drill stem, there was 10 ft. of drilling mud and 80 ft. of salt water at the bottom of the oil column. The water recovered during test will be analyzed and decision for further coring will be made. After the hole has reached total depth, production string of casing will be run to bottom and perforated opposite the oil sand.

CANADIAN WILDCAT FAILURES THIS WEEK

Canadian Delhi-Benton 1, LSD 11, 34-28-3w4, TD 2,954 ft.

Clear Petroleum 1, LSD 10, 3-57-19w4, TD 4,511 ft.

Socony-Grewer-Rowley 1, LSD 14, 15-32-20w4, TD 6,522 ft.

EASTERN CANADA

MANITOBA.—The Manitoba government has announced the discovery of oil in southern Manitoba, 10 miles west of Virden. This represents the first showing of free oil in the Williston basin, a geological area comprising a large part of southwest Manitoba and southeast Saskatchewan, which has long been regarded as a potential oil and gas area.

Last fall oil indications were encountered in cores taken at Melita, 30 miles south of Virden, but no free oil developed. The provincial government is taking steps to test the productivity of the Virden well. The oil is a little heavier than the Leduc crude in Alberta, but fairly comparable to the Redwater product. (For more details on this venture see "Rumblings from Manitoba," page 133 of this issue).

Louisiana-Arkansas

Caddo Parish Wildcat Has Good Oil Show

SHREVEPORT.—Activity in the North Louisiana-Arkansas oil districts was slowed down the past week by freezing weather and ice-covered roads to locations, but some operations continued as usual.

In the Cedar Grove area, Caddo Parish, Louisiana, Plymouth Oil Co. found a good oil show in its 1 A. L. Webb, 6-16n-13w. Pay sand was found in two cores in the Rodessa: 4 ft. from the interval at 4,787-4,817 ft. and about 1½ ft. from 4,817-35 ft. Electric log was run to 4,835 ft., total depth, and operator plans to drill some 5 ft. deeper and set producing string.

In Arkansas, the old dormant Smart area of Stephens field may get a reviving producer. Fitzwater & Cloud have tested Travis Peak oil in their 3 J. W. Smart, SW SE SE 11-15s-20w, Columbia County. Casing has been set at 3,400 ft. prior to completion attempts.

The south edge of West Nick Springs field will be tested at E. G. Bradham 1 Dunbar, NW NE NE 1-18s-15w, Union County. The field produces mainly from the Meakin sand around 2,500 ft., and Glen Rose pay has been established on the north side of the area; however, a second attempt offsetting the new producer was a failure. The new try, Pan-Am Southern Corp. 1 Nelson estate, SW SW NE 36-17s-15w, was plugged at 3,699 ft.

The lone operation in Catesville field, Murphy Corp. 1 Miles, SE NW 32-18s-15w, Union County, is below 5,660 ft. on the way to its scheduled 8,000-ft. depth.

Two Columbia County wildcats were drilling ahead: McAlester Fuel Co.'s Warnock Springs test, 1 Wilson-Nesbit unit, C SE 32-16s-19w, reached 6,800 ft. and is due to go to 7,500 ft.; Arkansas Fuel Oil Co.'s 10,500-ft. test, ¾ mile northeast of Taylor, in SE NW 1-19s-23w, is drilling around 5,500 ft.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Bienville Parish: Carter Oil Co. 1 Bates-Burson, 2-17n-8w, flowed 177 bbl. 33.7°-gravity oil per day from anhydrite stringer at 5,328-32 ft., TD 5,422 ft., new pay in Ada gas field.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: R. P. Oden et al 1 J. H. Ferguson, C S/2 SE NW 10-18n-13w, dry, TD 5,605 ft.

Caddo Parish: C. A. Hilburn et al 1 Muslow Oil Co., NW SW SE 18-19n-15w, dry, TD 9,504 ft.

Claiborne Parish: D. M. Lide et al 1 Evergreen Plantation, 2,928 ft. SE along Sec. line thence 758 ft. at right angle from north corner, 23-12n-13e, dry, TD 9,215 ft., Midway 6,320 ft., Cretaceous chalk 7,330 ft., Tuscaloosa 8,300 ft., Massive sand 9,113 ft.

Concordia Parish: Carter Oil Co. 1 Learned-Metcalf, NE NE SE 1-14n-8e, dry, TD 7,518 ft.

Red River Parish: H. E. Davenport et al 1 J. W. McClendon, NW NE SE 1-14n-11w, dry, TD 3,000 ft., Newcastle 951 ft., Austin chalk 2,540 ft., Tuscaloosa 2,640 ft., Lower Cretaceous 2,770 ft., Glen Rose 3,921 ft.

A.P.I. Meets March 7-9

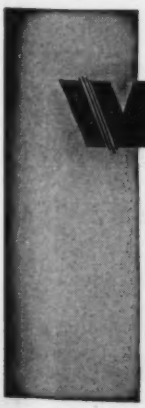
BEAUMONT. — The southwestern district of American Petroleum Institute's Division of Production will hold its twenty-fourth annual meeting here March 7-9, with the theme of: "Progress Since Spindletop."

Exhibits provided by Beaumont civic committees will add interest to the meeting, which will be held in the Beaumont Hotel. Sessions devoted to secondary-recovery methods, cementing, drilling fluids, drilling practices, and production practices, will be held. Also included will be papers calling attention to technical progress during the past 50 years in the oil industry.

Worthington Buys Pump Firm

OIL CITY, Pa.—Worthington Pump & Machinery Corp., Harrison, N. J., has purchased the land, buildings, and equipment of National Transit Pump & Machine Co. at Oil City, and will continue to manufacture repair and replacement parts for National Transit pumps.

National Transit will continue its dissolution and liquidation as voted by its stockholders last November 15. The company originally was a subsidiary of National Transit Co., a pipeline company, but was separated from the parent firm several years ago.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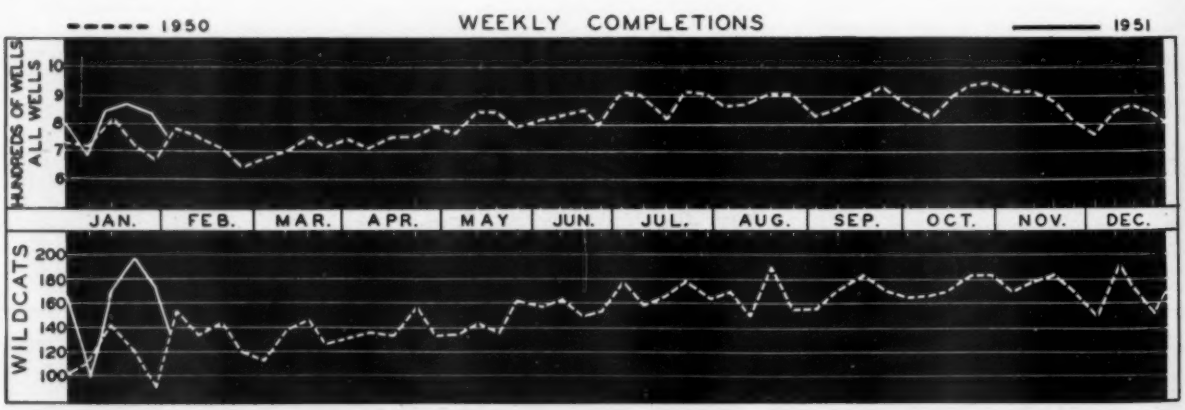
CURRENT STATISTICS

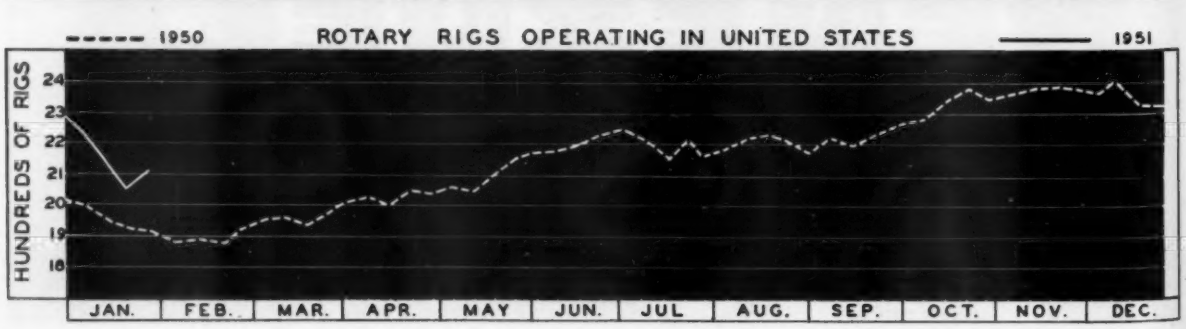
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED FEBRUARY 3, 1951

	Total of all wells					Feb. 3		Wildcat completions and discoveries					Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	6	4	0	*2	8,682	40	72	0	0	0	0	0	0	0	0	0	0
Pennsylvania	14	6	2	†6	27,336	81	112	0	0	0	0	0	0	0	0	1	1
West Virginia	13	1	7	5	38,378	65	56	0	0	0	1	1	0	0	2	2	4
Ohio	27	11	5	‡11	61,495	92	84	1	0	0	1	2	1	0	0	5	6
Indiana	7	4	0	3	16,177	107	96	0	0	0	0	0	1	0	0	11	12
Kentucky	11	6	3	2	20,918	93	88	0	0	0	2	2	1	0	0	15	16
Illinois	42	27	0	15	103,374	225	237	2	0	0	3	5	5	0	0	33	38
Michigan	13	5	1	7	30,583	63	73	0	0	0	3	3	0	0	1	23	24
Kansas	75	36	3	*36	255,312	394	300	7	0	0	11	18	20	0	1	67	88
Nebraska	1	1	0	0	4,702	29	7	0	0	0	0	0	0	0	1	11	12
Oklahoma	125	69	7	49	428,420	571	432	5	0	0	10	15	28	0	3	75	106
Texas	294	182	14	98	1,240,425	1,599	1,446	10	1	1	54	66	59	7	10	259	335
North Central (Dist. 7-B & 9)	88	44	0	44	235,933	462	417	4	0	0	22	26	26	0	0	106	132
West (Dist. 7-C & 8)	93	72	0	21	531,489	463	378	2	0	0	14	16	11	0	0	50	61
Panhandle (Dist. 10)	10	5	5	0	27,843	70	138	0	0	0	0	0	0	0	0	4	4
Eastern (Dist. 5, 6, & 6-P)	20	15	1	4	74,599	122	110	0	0	0	4	4	0	0	0	18	18
Gulf Coast (Dist. 2 & 3)	36	20	6	10	198,310	243	204	3	0	0	5	8	15	5	8	33	61
Southwest (Dist. 1 & 4)	47	26	2	19	172,251	239	199	1	1	1	9	12	7	2	2	48	59
Louisiana	39	20	1	18	285,991	215	267	1	0	0	8	9	3	0	0	30	33
Northern	18	11	0	7	88,264	106	140	1	0	0	5	6	1	0	0	17	18
Southern	21	9	1	11	197,727	109	127	0	0	0	3	3	2	0	0	13	15
Arkansas	7	5	0	2	20,952	49	38	0	0	0	0	0	1	0	0	9	10
Mississippi	5	1	0	4	31,727	21	32	0	0	0	3	3	2	1	0	6	9
Southeastern States	2	1	0	1	6,834	9	5	0	0	0	0	0	0	0	0	2	2
Montana	0	0	0	0	0	14	16	0	0	0	0	0	0	0	0	1	1
Wyoming	10	7	1	2	49,272	63	68	0	0	0	1	1	1	0	0	12	13
Colorado-Utah	5	0	2	3	7,967	28	15	0	0	0	2	2	0	0	0	14	14
New Mexico	16	5	8	3	57,520	63	76	0	0	0	2	2	1	0	3	9	13
California	41	29	1	11	175,226	164	171	0	0	0	9	9	3	0	0	35	38
Miscellaneous	0	0	0	0	0	3	1	0	0	0	0	0	0	0	2	1	3
Total United States	753	420	55	278	2,871,291	3,988	3,702	26	1	1	110	138	126	8	23	621	778
Total previous week	837	466	47	324	3,186,337	....	....	29	2	6	137	174	100	7	22	511	640
Total February 3, 1950	793	458	47	288	3,082,836	....	....	23	3	8	122	156	95	10	25	492	622

Service wells included: *2, †5, ‡1.





DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 3 crude oil	B. of M. Feb. demand	Jan. 27 crude oil
Alabama	2,800	2,400	2,800
Arkansas	78,750	88,000	79,600
California	965,900	968,000	965,300
Colorado	77,300	72,000	81,400
Eastern	60,450	67,000	61,050
Florida	1,550	1,600	1,615
Illinois	166,500	172,000	165,800
Indiana	28,400	31,000	28,700
Kansas	304,100	304,000	321,550
Kentucky	28,000	31,000	29,100
Louisiana	599,400	620,000	595,675
North Louisiana	115,950	.....	116,400
South Louisiana	483,450	.....	479,275
Michigan	42,900	46,000	43,300
Mississippi	103,700	116,000	105,000
Montana	22,500	23,000	22,200
Nebraska	8,800	7,000	8,650
New Mexico	135,150	138,000	134,250
Oklahoma	504,750	483,000	499,800
Texas	2,554,700	2,425,000	2,658,700
Dist. 1 (Southwest)	32,200	.....	33,250
Dist. 2 (Southwest)	152,775	.....	161,925
Dist. 4 (Southwest)	238,525	.....	249,075
Dist. 3 (Gulf Coast)	454,300	.....	471,675
Dist. 5 (Eastern)	46,350	.....	48,700
Dist. 6 (Eastern)	102,625	.....	107,025
East Texas field	272,000	.....	272,000
Dist. 7-C (West)	78,100	.....	81,200
Dist. 8 (West)	856,750	.....	898,250
Dist. 7-B (W. Central)	77,650	.....	81,000
Dist. 9 (N. Central)	153,425	.....	164,600
Dist. 10 (Panhandle)	90,000	.....	90,000
Utah	3,200	5,000	3,200
Wyoming	182,100	180,000	181,500
Total United States	*5,870,950	5,780,000	5,989,190
Change from prev week, down	118,240		
Canada	77,235	.....	.....

Total U. S. production January 1-February 3 ... †208,010,985 bbl.
Same period last year (crude plus cond.) ..... 168,985,455 bbl.

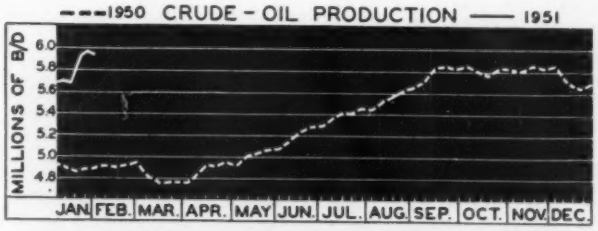
*Not including 105,280 bbl. condensate. †Including 3,503,080 bbl. condensate.

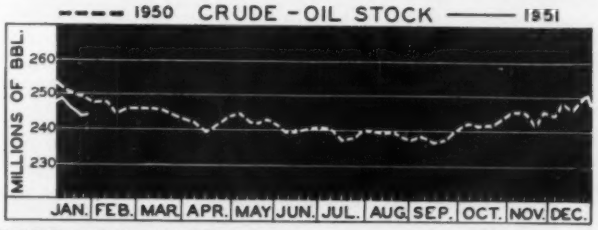
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

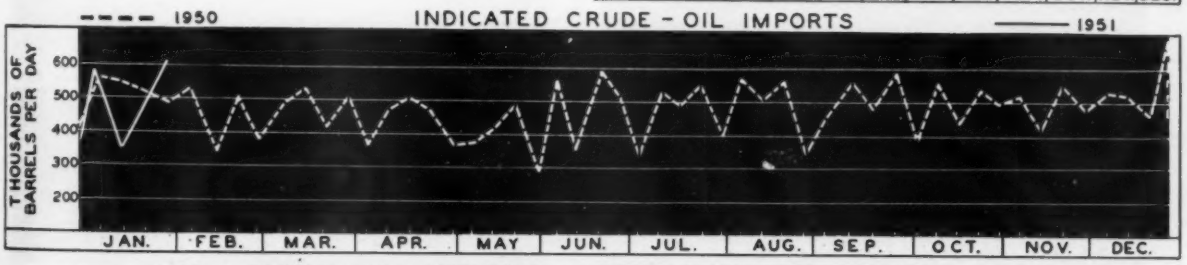
(Thousands of barrels daily)

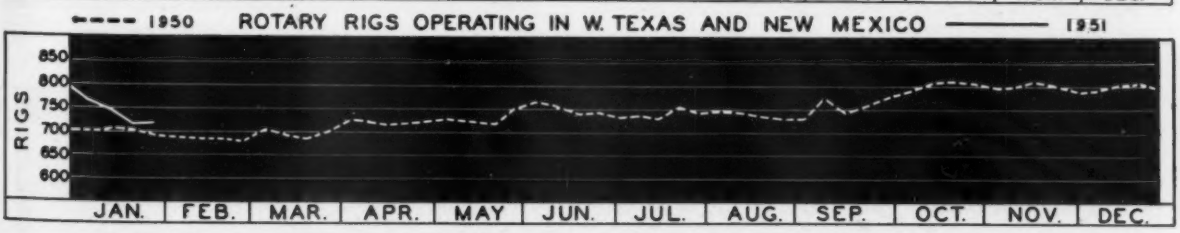
	Jan. 27, 1951	Jan. 20, 1951	Jan. 28, 1950
Pennsylvania Grade	2,102	2,079	2,697
Other Appalachian	1,261	1,145	1,890
Illinois, Indiana, Michigan	10,230	10,067	10,798
Arkansas	2,464	2,484	3,150
Louisiana	14,702	14,889	14,351
North	2,889	2,969	3,617
Gulf	11,813	11,920	10,734
Mississippi	3,656	3,632	2,447
New Mexico	6,937	6,965	7,268
Oklahoma and Kansas	38,446	38,021	36,771
Texas	114,387	114,216	110,965
East Texas	14,184	13,935	14,862
West Texas	45,387	45,204	39,675
Texas Gulf	26,884	27,628	29,601
Other Texas	27,932	27,449	26,827
Rocky Mountain	12,302	12,207	13,187
California	31,289	31,249	37,566
Foreign	6,454	6,290	7,321
Total	244,230	243,244	248,411

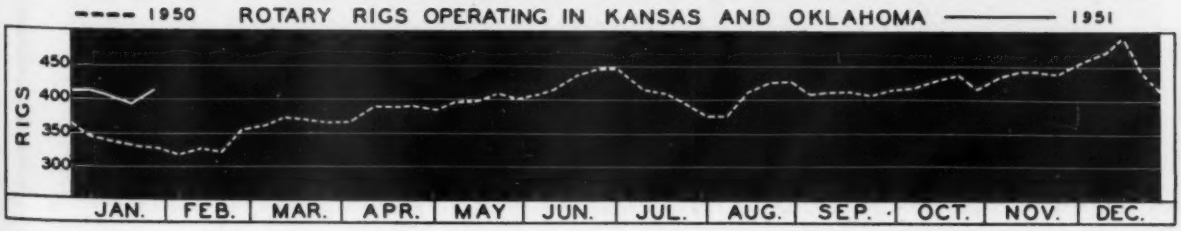
*Bureau of Mines.









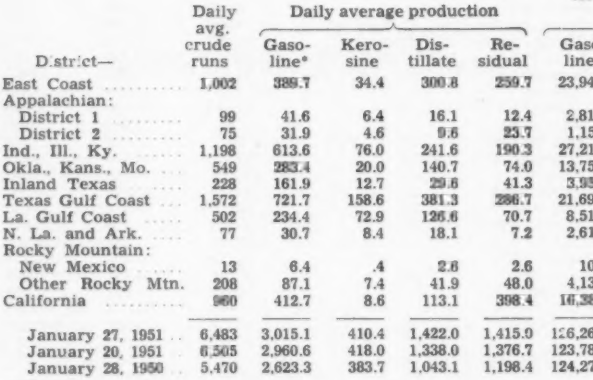


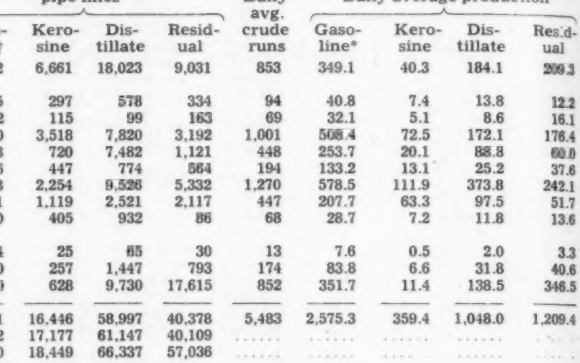
A.P.I. REFINERY REPORT, JANUARY 27

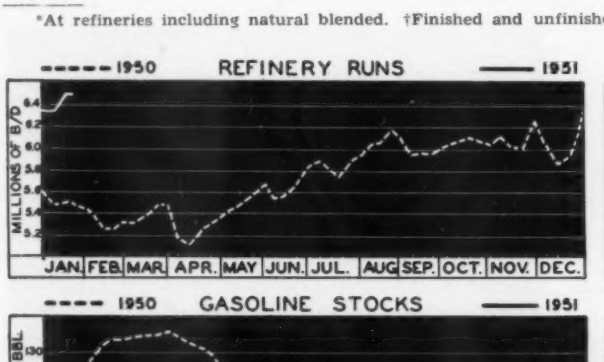
(Thousands of barrels)

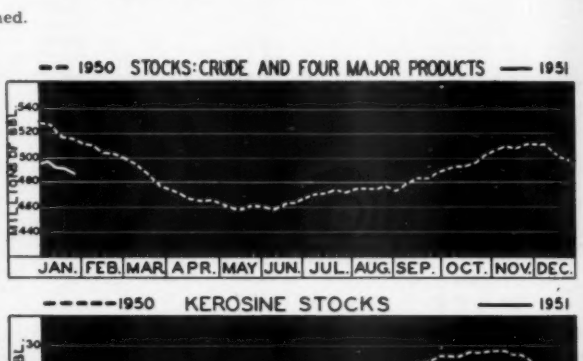
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, January 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,002	389.7	34.4	300.8	259.7	23,942	6,661	18,023	9,031	853	349.1	40.3	184.1	299.3
Appalachian:														
District 1	99	41.6	6.4	16.1	12.4	2,815	297	578	334	94	40.8	7.4	13.8	12.2
District 2	75	31.9	4.6	9.6	23.7	1,152	115	99	163	69	32.1	5.1	8.6	16.1
Ind., Ill., Ky.	1,198	613.6	76.0	241.6	190.3	27,210	3,518	7,820	3,192	1,001	508.4	72.5	172.1	176.4
Okla., Kans., Mo.	549	283.4	20.0	140.7	74.0	13,758	720	7,482	1,121	448	253.7	20.1	88.8	60.0
Inland Texas	228	161.9	12.7	29.6	41.3	3,956	447	774	564	194	133.2	13.1	25.2	37.6
Texas Gulf Coast	1,572	721.7	158.6	381.3	286.7	21,693	2,254	9,526	5,332	1,270	578.5	111.9	373.8	242.1
La. Gulf Coast	502	234.4	72.9	126.6	70.7	8,511	1,119	2,521	2,117	447	207.7	63.3	97.5	51.7
N. La. and Ark.	77	30.7	8.4	18.1	7.2	2,610	405	932	86	68	28.7	7.2	11.8	13.6
Rocky Mountain:														
New Mexico	13	6.4	.4	2.6	2.6	104	25	65	30	13	7.6	0.5	2.0	3.3
Other Rocky Mtn.	208	87.1	7.4	41.9	48.0	4,130	257	1,447	793	174	83.8	6.6	31.8	40.6
California	960	412.7	8.6	113.1	398.4	16,380	628	9,730	17,615	852	351.7	11.4	138.5	346.5
January 27, 1951	6,483	3,015.1	410.4	1,422.0	1,415.9	126,261	16,446	58,997	40,378	5,483	2,575.3	359.4	1,048.0	1,209.4
January 20, 1951	6,505	2,960.6	418.0	1,338.0	1,376.7	123,782	17,177	61,147	40,109	.....	.....	.....	.....	.....
January 28, 1950	5,470	2,623.3	383.7	1,043.1	1,198.4	124,270	18,449	66,337	57,036	.....	.....	.....	.....	.....

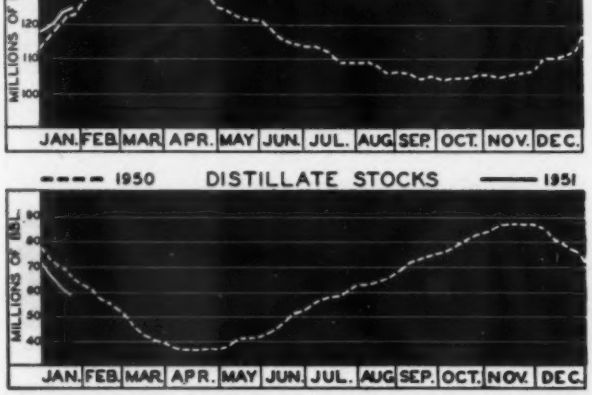
*At refineries including natural blended. †Finished and unfinished.

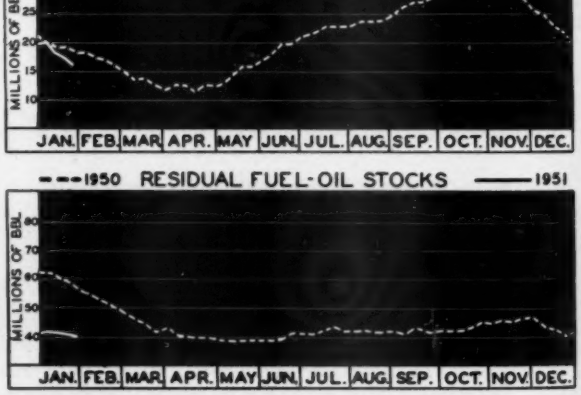


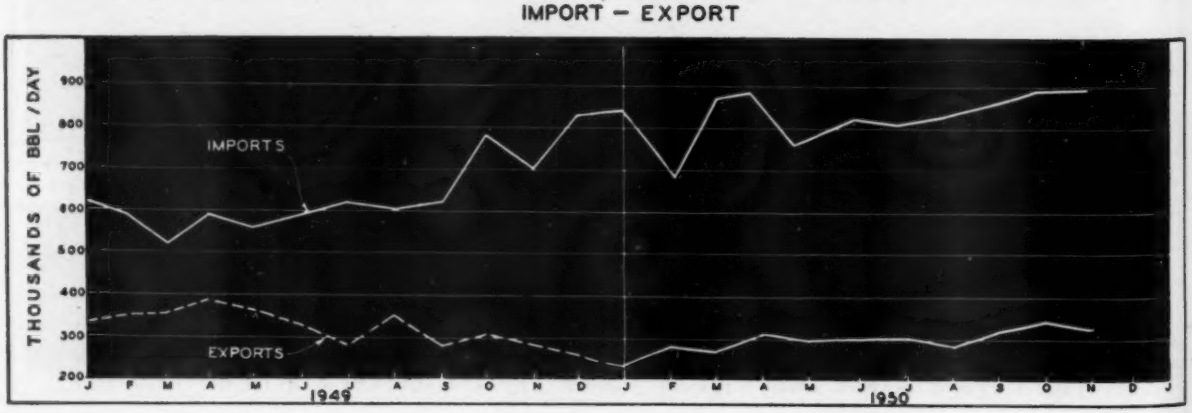












CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

RAIL strikes have tied up many tank cars in northern yards, and the car shortage may have an indirect effect on Group 3 spot prices.

Walkouts by railroad switchmen at many key rail centers in northern and eastern states halted the movement of many tank cars, both empty and loaded. Even an early settlement of the strikes would leave a car shortage in the Mid-Continent for some time. The "sickness" strikes started at a time when tank-car movement was at a peak because of the very cold weather in the high-demand areas of the northern states. Many suppliers at the end of January had just finished working off the backlog of orders that piled up during December. Even with all cars moving, the current high demand for fuels would have resulted in more shipping instructions than suppliers could have handled in the first 2 weeks of February. With many cars inactive in northern yards, spot shortages are developing in many areas where peak demands can be met only by increased rail movement.

When cars were more readily available in the last half of January, some suppliers on the Group 3 market were asking and getting top prices for distillate fuel in buyers cars. The problem now is one of locating cars rather than material, and the buyer with cars may be able to find distillate nearer the low of the market.

Another factor in the possible shortage in north-central areas is the preference for short hauls by Mid-Continent suppliers with cars. With cars at a premium, more fuel can be moved on sales to nearby areas.

No solution has been found for the problem of high costs and frozen prices on the East Coast. The situation will reach the crisis stage for some marketers when their ship charters expire this spring and can be renewed only at rates high enough to raise costs above ceilings.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of February 5, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10½-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11½-11½	13.5-13.75	11½-12
42-44 w.w. kerosine	9¼-9⅜	10-10.1	8¾-9
No. 2 straw fuel oil	8⅜-8⅝	9-9.25	7¾-8
No. 6 residual	$1.80-1.90	$2.25-2.30	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

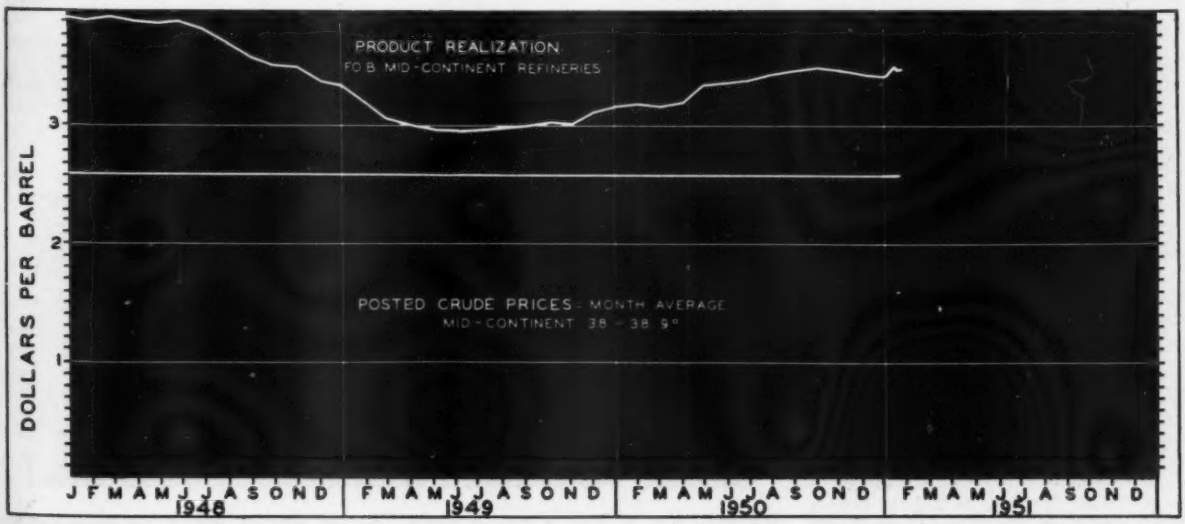
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.9


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.52 for week ended January 27, $3.51 for previous week, and $3.19 for January 1950.

EQUIPMENT MEN . . . in the News

Manning, Maxwell & Moore Makes Key Staff Changes

Chester H. Butterfield, vice president and general manager of the Consolidated-Ashcroft-Hancock division of Manning, Maxwell & Moore, Inc., has appointed Robert E. Mason as director of mobilization planning for the division and Leslie T. Willard as works manager of the combined Bridgeport and Stratford, Conn., plants. Mason joined the company in 1948, and until this new assignment was works manager of the company's Bridgeport plant.

Willard has had many years of varied industrial experience with such companies as Allied Chemical & Dye Corp., U. S. Hammered Piston Ring Co., and Grafton & Knight Manufacturing Co. He joined Manning, Maxwell & Moore in 1943 as production control manager, Bridgeport plant, and for the last 3 years has been works manager of the company's Stratford plant.

Strata Crete Names Hall As Division Sales Manager

DON HALL

Don Hall has been appointed division sales manager for the sales of Strata-Crete and Strata-Seal, two products recently made available to the oil industry by Great Lakes Carbon Co.

The announcement was made by R. M. Cook, manager of Strata-Crete sales division. Previous to this appointment, Hall was sales manager for McCullough Tool Co. Prior to that he was district superintendent with Lane-Wells Co.

The division that Hall will be responsible for embraces California, San Juan basin, Nevada, and Utah.

He will maintain headquarters at the main offices of the Strata-Crete division at Long Beach, Calif.

J. H. Baxter & Co. Moves To Standard Oil Building

San Francisco headquarters for J. H. Baxter & Co., western producers of pressure-treated forest products, were moved recently to the Standard Oil Building, San Francisco. The new Baxter office will occupy the two penthouse floors of the building. The move was necessitated by the expansion of Baxter's business following the acquisition of a large new wood-preserving plant at The Dalles, Ore. This plant, one of the largest and most modern in the country, was leased from Union Pacific Railroad Co., and will be operated by an affiliated company, The Baxco Corp.

Hassebroek Named to New Halliburton Post

W. HASSEBROEK

Creation of a new post, technical supervisor of Hydrafrac service operations, has been announced by Halliburton Oil Well Cementing Co. Named to fill the post is Willard Hassebroek, Halliburton development engineer. Currently, Halliburton has expanded its Hydrafrac process operations throughout the United States, and is moving into foreign fields with the process.

The new technical supervisor graduated from Oklahoma A. & M. College in 1935 with a B.S. degree in chemical engineering. With Halliburton for the past 16 years, he has worked throughout the Mid-Continent area as a field engineer, and since 1942 has been at Duncan, Okla., Halliburton's home office.

Hassebroek's duties are coordinating Hydrafrac field services with research and development, disseminating operating and general information, and handling materials supply. He is attached to the staff of W. D. Owsley, Halliburton's vice president for technical advice to management

George Basquez is New Emsco Advertising Manager

GEORGE BASQUEZ

Appointment of George Basquez as sales promotion and advertising manager has been announced by Emsco Derrick & Equipment Co. He took over the post held by E. B. (Ernie) Fowks, when the company moved its advertising and sales promotion offices from Los Angeles to Houston.

Basquez has had a varied experience in drilling, production, manufacturing, and sales, interrupted by 4½ years in the Army.

For 4 years after leaving University of Texas, where he majored in geology, Basquez worked for Shell Oil Co., leaving to enter the service. On his return he joined Emsco in Houston. Immediately prior to his appointment as sales promotion and advertising manager he was city salesman for Emsco in Houston, Corpus Christi, and New Orleans.

Hendrickson to Head Smith Welding Equipment Sales

A. G. Hendrickson has joined A. O. Smith Corp. as welding equipment sales manager. He will function under welding division manager L. F. Vonier, who until now has actively managed sales of both welding electrodes and welding machines. Welding Division Manager L. T. Hickey says that the appointment of Hendrickson marks A. O. Smith's increased

Web Wilson Office Building Opened in Los Angeles

The new office of Web Wilson Oil Tools, Inc., Los Angeles, houses the administrative, engineering, and general office staffs of this rapidly growing organization. Various new products, including a line of production tools, are being introduced as a result of the expanded facilities.

emphasis on marketing of welding equipment for industrial use.

A. O. Smith manufactures a line of welding machines ranging from a 180-amp. farm welder through a heavy-duty 650-amp. welder for production manufacturing operations, as well as other units for light industrial and repair-shop use.

Hendrickson went to A. O. Smith from the Harnischfeger Corp., where he was assistant manager of the welder sales division.

Lunkenheimer Sales Manager Receives Award for Service

Harold H. Layritz, sales manager of The Lunkenheimer Co., valve manufacturers, received his 30-year service pin at a presentation in conjunction with the Cincinnati company's annual international sales convention held recently in Cincinnati.

Layritz was one of seven Lunkenheimer employes honored for continuous service. Perry Cooper, Detroit, and T. J. McGill, Pittsburgh, received recognition for 15 years' service; E. F. McAbee, Baltimore, R. C. Forbes and A. F. Stack, Boston, and H. J. Tonkin, New York, were awarded 5-year pins.

H. A. Burdorf, vice president in charge of sales, The Lunkenheimer Co., presents a 30-year service pin to Harold H. Layritz, sales manager.

Layritz, who was presented with his award by H. A. Burdorf, vice president in charge of sales, himself a 45-year veteran, started with Lunkenheimer while still a co-op student at University of Cincinnati in 1920. He served his apprenticeship through various Lunkenheimer departments and remained with the company following completion of his engineering course, working in various phases of sales and advertising, including an assignment as field representative in West Virginia.

Layritz was appointed assistant sales manager in 1947 and sales manager 2 years later.

Enterprise Diesel Meeting Held at Sonoma

Participants in Enterprise Engine & Machinery Co.'s annual sales meeting held at Sonoma, Calif., January 15 are: (seated) J. E. Watson, general sales manager; W. E. Clayton, Jr., secretary; J. W. Coombs, member of the board of directors; W. E. Butts, president; P. I. Birchard, vice president and general manager; H. T. Anderson, district manager, New York; G. B. Wright, representative, Chicago; and G. C. Rasey, sales manager, engine division.

Second row: P. B. Erwin, district manager, Los Angeles; L. J. Robbins, district manager, St. Louis; W. H. Porter, district manager, Seattle; T. S. White, technical engineer; H. G. Bahr, manager, service department; J. M. Maag, representative, Kansas City; K. F. Cramer, representative, Kansas City; D. S. Briese, advertising manager; H. J. Dauphinee, export sales; H. F. Neuman, stationary sales.

Back row: G. J. Brusher, marine sales; H. H. Goodwin, sales engineer, New York; P. K. Wabnig, district manager, New Orleans; W. E. Bishop, representative, Washington, D. C.; J. E. Barthmaier, district manager, Boston; M. T. Prendergast, manager, parts department; W. Malone, sales engineer, Chicago; H. L. Hansen, chief service engineer; T. S. Pennebaker, district manager, Fort Worth; J. H. Sheusner, chief engineer.

Burgess-Manning Announces Expansion of Facilities

R. L. LEADBETTER

Expansion of facilities of Burgess-Manning Co., manufacturers of exhaust and airline snubbers and noise-abating products, has been announced by W. L. Manning, president. Manning revealed the company is setting up new divisions in Dallas and Chicago. He also announced realignment of personnel at the Libertyville and Ashippun plants.

R. L. Leadbetter, vice president, has been placed in charge of the Dallas headquarters, established to handle sales, engineering, and development in the petroleum industry, including refining, gas transmission, and the petrochemical fields.

Leadbetter will be assisted by S. G. Paddock as manager of sales, and A. P. Gallagher as engineering assistant.

Dudley W. Day, director of marketing, has been named manager of a new architectural-products division. Assisting Day will be A. C. Kelley, sales, and A. T. Jorn, engineering.

C. P. Certik has been named manager of the Libertyville and Ashippun activities, with H. A. Dietrich as manager of sales.

Field Engineers Visit Martin-Decker Plant

In preparation for marketing Martin-Decker's new Type "F" weight indicator and National Supply's Ideal wire line anchor, several Martin-Decker field engineers recently visited the Martin-Decker plant at Long Beach.

Attending the intensive instruction course were Martin-Decker factory representatives Jack Clemens of the Gulf Coast, "Mutt' Donovan of the Mid-Continent area, and Carroll Kelso of West Texas. Another Martin-Decker man who visited the plant was Sandy Sandhoff, special company representative who is currently touring the oil country showing a Martin-Decker movie.

Dravo Names Fieger as Shop Manager of Piping Plant

Henry G. Fieger has been appointed shop manager for Dravo Corp.'s fabricated piping plant at Marietta, Ohio.

Fieger was associated with Dravo during World War II and for the past 5 years was eastern regional manager for a steel products company.

A graduate of Washington and Jefferson College, Fieger took post

XUM

graduate courses at University of Pittsburgh.

The Marietta plant is engaged in the fabrication of piping for power plants, the oil and gas industry, and general industrial applications.

Bethlehem Holds Annual Managers' Meeting in Tulsa

Bethlehem Supply Co. held its annual managers' meeting in Tulsa January 17-19. Attendance included representatives of Bethlehem Steel Co., Bethlehem Supply Co. of California, and all district and resident managers of Bethlehem Supply Co. Local management and special representatives of Bethlehem Supply Co. who participated in the meeting included: G. A. Tompson, president; C. R. Zimmerman, executive vice president; J. F. Eaton, vice president, manufacturing; I. C. Smith, general manager of sales; H. R. Powers, assistant manager of sales; Christian Seger, Jr., treasurer; R. G. Petri, auditor and assistant secretary; V. W. Bailey, northern division manager; C. C. Crider, southern division manager; Lee Fagg, G. L. Reid, H. E. Davidson, H. A. Barnes, W. B. Cotton, R. L. Timmons, R. L. Neal, W. F. Taylor, R. M. Berman, H. R. Klein, W. M. Sanders, H. A. Wilson, R. E. Dow, and R. F. Arbs.

Bethlehem Steel Co. representatives attending the managers' meeting were: J. C. Miller, manager of sales, bolts, nuts, and sucker rods; N. R. Downie, manager of sales, wire rope and strand; O. E. Berg; and J. S. Worth, assistant metallurgical engineer, from Bethlehem, Pa.; B. C. Macgregor, general manager, central sales, from Pittsburgh; R. E. Burns, manager of sales, from St. Louis; B. C. Ramage from Houston; and J. L. McBride, district purchasing agent, from Los Angeles. Local representatives of Bethlehem Steel Co. included J. J. Lovell, resident representative; J. A. Dudley, R. L. Cooney, H. M. Cooley, and N. B. Heywood.

Bethlehem Supply Co. of California was represented at the meeting by Wendell M. Jones, vice president and general manager; J. R. B. Freeman, manager of stores; J. C. Graves, manager of machinery sales; and R. M. Arthur, district purchasing agent.

Bethlehem Supply Co. out-of-town personnel who attended the meeting were: L. R. Estes, Corsicana, Tex., plant manager; Fred Parks, Houston; J. C. Knoll, Fort Worth; and F. R. House, Dallas, all resident managers; and the following district managers: O. H. Crow, Houston, W. J. Brady, Corpus Christi; J. B. Ellzey, New Iberia; J. G. Floyd, Shreveport; W. A. LaRew, Midland; W. T. Davis, Oklahoma City; E. S. Lewis, Casper; R. A. Johnson, Wichita; W. E. Stephenson, Wichita Falls; G. B. Sager, Salem, Ill.; and H. S. Sutton, Pampa, Tex.

Neumann Imo-De Laval Products Division Manager

W. A. NEUMANN

G. W. Smith, Jr., president of De Laval Steam Turbine Co., has announced the appointment of W. A. Neumann, Jr., as manager of the Imo-De Laval Products Division. In this capacity Neumann will be responsible for the engineering and sales of the company's line of power-transmission equipment and rotary pumps. He has served as acting manager of this division for the past year. In addition to his new responsibilities, Neumann will continue as assistant treasurer of the company. He previously held the position of controller.

Prior to Neumann's association with De Laval in 1946, he was with Westinghouse Electric Corp. for 9 years, serving in various accounting and administrative capacities in the office of the president. Neumann is a graduate in mechanical engineering of University of Michigan and holds a master's degree in business administration from the same university.

National Tube to Add Large Extrusion Plant at Gary

J. E. Goble, president of National Tube Co., United States Steel subsidiary, has announced that a large extrusion plant for the manufacture of high-alloy seamless specialty tubes, as well as shapes and bars, will be installed at the Gary works of the company. The application of the extrusion process on a commercial basis to the manufacture of seamless steel tubes is an innovation in this country.

The facilities, which will be housed in an existing building at the plant, will consist of a 2,500-ton hydraulic extrusion press and related facilities for the production of tubes ranging from 1½ to 6½ in. in diameter with wall thicknesses up to ¼ in. and lengths up to 60 ft. The new installation will also be capable of producing various shapes and bars from ½ to 4½ in.

It is expected the extrusion plant will have a capacity of approximately 3,000 tons of special tubes and shapes per month, and that the operation of the facilities should be possible before the end of 1951.

Ideco Opens Midland Office

T. D. (Hi) Collins, vice president, Ideco Supply Stores Division, International Derrick & Equipment Co., recently announced the opening of sales offices in Midland, Tex.

George W. H. Bush, city sales representative for Midland, will be in charge. The new offices are located on the ground floor of the Petroleum Building.

Schlumberger Moves Davis to Edmonton

R. C. Davis, former manager of the Hobbs, N. M., district office of Schlumberger Well Surveying Corp., has recently been transferred to Edmonton, Alta., Canada, to be placed in charge of that district.

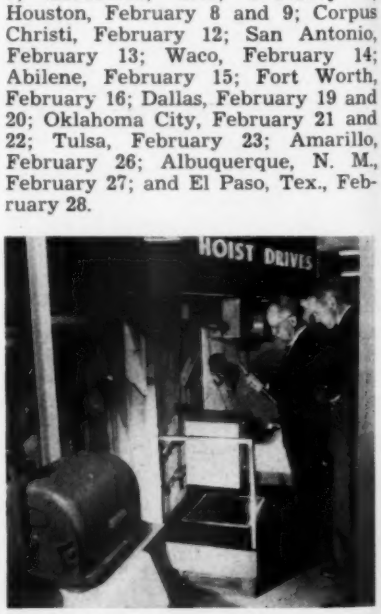
C. W. Trainer, assistant district manager at Snyder, Tex., will replace Davis as district manager in the Hobbs office.

G-E "More Power" Train to Tour Southwest in February

General Electric Co.'s More Power to America Special, a 10-car, streamliner train carrying exhibits of more than 2,000 electric products, systems, and techniques, many of them applicable to the petroleum industry, will visit 14 key industrial centers in the Southwest during February.

Exhibits aboard the train cover such equipment as turbines, hydrogenerators, substations, transmission equipment, motors, complex drive systems, industrial lighting fixtures, precise instruments, welding and heating equipment, and controls.

Tentative itinerary for the train's exhibition in the Southwest area is as follows: Shreveport, La., February 6; Beaumont, Tex., February 7; Houston, February 8 and 9; Corpus Christi, February 12; San Antonio, February 13; Waco, February 14; Abilene, February 15; Fort Worth, February 16; Dallas, February 19 and 20; Oklahoma City, February 21 and 22; Tulsa, February 23; Amarillo, February 26; Albuquerque, N. M., February 27; and El Paso, Tex., February 28.



C. H. Lang, vice president in charge of sales for General Electric Co.'s apparatus department, and C. P. Fisher, Jr., manager of the apparatus exhibit train division, spot a dummy load in the materials handling section of the More Power to America special train.

(Continued on page 160)

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$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

FOR SALE—One truck mounted Sullivan 200 Rotary Drilling Rig complete including 2,000 feet of new 2 and 7/8" drill pipe, drill collars, light plants, water pumps, dog house; three other trucks, one new 5 x 10 mud pump and motor operating as a separate unit. Box D-828, The Oil and Gas Journal, Tulsa, Oklahoma.

ONE Gardner - Denver Compressor Unit size 12 x 11 and 4¾ x 11, direct connected with 100 HP electric RPM motor, complete with all equipment; located at Refugio, Texas; in service forty-five days, Will take reasonable discount. Clymore Petroleum Corporation, 238 Kaffie Building, Corpus Christi, Texas.

3 USED Pressure Vessels, 6' x 20' overall Shell 1¼" steel, Dished Heads—1½" steel, Weight 24,800 lbs. each. American Pipe & Supply Co., 3403 Brighton Boulevard, Denver 5, Colorado.

FOR SALE: Emsco 129 foot jackknife derrick, 10 foot substructure. Excellent condition, used on only three wells. Two 6NKU Waukesha motors, never used. 215 joints 4½ inch drill pipe equipped with new Hughes counter weld bore 6 inch tool joints. One 50 foot U.S. 2½ inch rotary hose, 3 inch connections. For price write 525 Wichita National Bank Building, Wichita Falls, Texas.

FOR SALE: 1946 Cardwell QST Servicing unit with 48' 7"x8" Cardwell Mast. Suitable for 3500' 2½" tubing. Complete set tubing and rod tools. Mounted on 3-Ton EH Mack truck. Frank Jones, McPherson, Kansas.

CARDWELL Spudder, Model R-L, complete with mast, power, tools, doghouse, all ready to go. $14,000.00. E. E. Brook, 807 Colcord Bldg., Oklahoma City, or Phone L.D.231.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE TANK BATTERY

2—10 x 16 Welded Steel Tanks (with walkway)
1—16 x 20 Bolted Steel Tank (Galvanized)
1—125# National Separator (4' x 16½')
1—BS&B Volume Type Heater (25# w.p., 50# test)

Located in Western Kansas

Bankoff Pipe & Supply Co.
P. O. Box 2301 Phone 6-2119
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: 138 joints (approx. 4300') of 4" OD Drill Pipe Counterbore weld with tool joints 5⅛" to 5¼" OD with modified threads, Range 2 pipe. This is good used drill pipe. G. E. Kadane & Sons, 818 Hamilton Bldg., Wichita Falls, Texas.

FOR SALE: 36-L Bucyrus-Erie Spudder, with L1-600 Cummins Diesel Engine, Unit skid mounted, 54' steel telescoping mast, with catheads, 5" to 7" tools, new lines, steel dog house, 3 K.W. Diesel light plant, steel structure and floors. All equipment practically new. Will furnish inventory on request. J. C. Shaffer, Inc., P. O. Box 4365, Oklahoma City, Okla. Ph. 6-9905.

FOR SALE: Lapweld casing 2300'—5⅜"—17#; 1000' 6⅝"—17#; 300'—8¼". Tubing 6000' 2"—4½#; 3000'—¾". Used—No. 1 condition. Also used H.P. screw gates, check valves, casing heads, anchor clamps, etc. in good as new condition. Davis McInturf, Pennsville, Ohio.

FOR SALE: Double Drum Wilson Well Servicing Machine with Pole, powered with 100 Horsepower Waukesha. With or without K B-7 International Truck. Write E. N. Brock, Box 125, Artesia, New Mexico. Phone 423-J.

EQUIPMENT FOR SALE

NEW TOWERS—1 7'-6" ID x 85'-7", 21 steel trays. One propane deasphalting plant, consisting of 3-3' ID x 50', 500# treating towers; 2-3' ID x 38' stripping towers; 1-3' x 20' scrubbing tower; 1-2' x 14' suction trap; 1-2' x 14' Interstage cooler. Kinslow Power & Equipment, Inc., 817 South Boulder, Tulsa, Oklahoma.

FAILING Model "1500" Core Drill, equipped for both conventional and reverse circulation, w/ 4½" x 6" pump, heavy-duty drillhead, Kohler 1500 W Light Plant, mounted on 1946 International K-7 truck with new motor; 1948 Ford F-6 water truck w/ 500 gal. vacuum lift and Tulsa winch; 1949 1-Ton Jeep pickup w/ 4-wheel drive and new "F-Head" motor; 500' 2⅜" O.D. internal flush tubing, .28 thickness w/ 2⅞" tool joints. Can be seen in operation till Feb. 15th at 702 Wilson Street, Emporia, Kansas. Call 2539-M. New tires throughout. Top condition.

NEW J-55 CASING AND TUBING
Trade for
Override or Working Interest
Write
P. O. BOX 1858, TULSA, OKLAHOMA

FOR SALE

50,000' 1" Standard Black Plain End Seamless, 16'-21' Lengths, Tested 700#.
100,000' 2" O.D. x .145" Wall 2.7# Reconditioned Seamless Tubing, 14' Lengths and Over.
40,000' 2⅜" O.D. 3.75# & 4# Good Used Lapweld T&C Range 1 Line Pipe.
30,000' 2⅜" O.D. 4# Good Used Lapweld Range 1 Tubing with New 11½ V-Thds. and Collars.
8,000' 3" O.D. x .300/.375" Wall 9.7# Seamless Tubing, Plain Ends, 23'-26' Lengths.
15,000' 4" O.D. x .140/.160" Wall Reconditioned Seamless, Plain Ends, 14' Lengths and Over.
5,000' 4" Standard Black Used, T&C, Fair Grade, Good for Low Pressure Line.
3,200' 5" O.D. x .438/.563" Wall 24.03# Seamless Tubing, 17'-25' Lengths.
1,700' 5½" O.D. 10# Reconditioned Seamless Casing, New 11½ V-Threads and New 5⅛" Collars (Recommended for Shallow Wells).
10,000' 6⅝" O.D. 13# Good Used Lapweld Range 1 T&C Casing.
50,000' 6⅝" O.D. 18.97# Excellent Grade Used Lapweld, Cleaned, Beveled Ends, 20' Random Mill Lengths.
12,000' 7" O.D. 17# Good Used Lapweld Range 1 T&C Casing, 11½ V-Thds.
10,000' 8⅝" O.D. 25# Good Reconditioned Casing, T&C, 8 V-Thds., Range 1.
5,700' 10¾" O.D. 32.75# Good Used Lapweld T&C Casing, Range 1, New 8 Round Threads and 8" Long Collars.

THIS MATERIAL IS AVAILABLE FOR IMMEDIATE DELIVERY, SUBJECT TO PRIOR SALE

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker
SIDney 1781 (Day Phone) HUDson 8152 (Night Phone) . . . 4946 Murdoch, St. Louis, Mo.

EQUIPMENT FOR SALE

FOR SALE: Fred E. Cooper-Allis-Chalmers Model W Double Drum Skid Winch complete with mast frames and electric starting. Has only worked on two wells. Would make ideal rod and tubing machine for work up to 3000'. Write or call Buckeye Supply Company, Zanesville, Ohio.

14" x 7¼" x 14" Gardner-Denver "Super Booster" Steam Pump—1500# Pattern—Good Condition. Halloran Equipment Co., 5702 Harvey Wilson Drive, Houston 20, Texas. Phone Wayside 5158.

FOR SALE: BUCYRUS-ERIE MODEL 36-L SPUDDER, equipped with Waukesha GK-140 gas-gasoline engine with Butane attachments, skid mounting. Casing Tackle Strut, Tool Crane, good ⅞" drilling and casing lines, fair ½" Sand Line, and complete hand tools. Steel dog house, 1500 gallon Butane tank and Junk Rack—Price: $17,500.00. Everything in excellent condition, rig having been used for tailing-in 5" holes. Can equip with dual-tired rear axle and trailer bracket for $750.00. Also have tailing-in and top-to-bottom tools for sale. Randall-Zogg Supply Company, Princeton, Indiana. Phones: 802 and 219.

NEW GATE VALVES

10—Powell 14", 300# Motorized.

●

Also the following

NEW VALVES

Available for Immediate Delivery.

2—R.P.&C., 12", Gate, OS&Y, 125#
19—R.P.&C., 6", Gate, IBBM, 125#
6—R.P.&C., 4", Gate, IBBM, 125#
3—Walworth, 12", Lub. Plug, 150#
3—Walworth, 8", Lub. Plug, #300
6—Walworth, 3", Lub. Plug, #150

●

PUMPS

The Following **New** Dayton-Dowd Pumps Are For Immediate Delivery:

		Ratings			
		GPM		Head	
Qu.	Type	From	To	From	To
11	DS8-2	200	700	30'	152'
11	DS10	35	150	46'	228'
5	DS8	350		164'	
1	C-10	100		251'	
2	C-8	100		144'	
2	TU-8	185		246'	

●

HALF-TRACK TRUCK

Ideal for Exploratory Trips Over Rough Terrain. Completely equipped with rubber cat treads; Tulsa front mounted winch; rear and front wheel drive; hi and lo speed transmission; 4 speed and reverse transmission; 1 spare set of rubber cat treads.

●

NEW ELECTRIC MOTORS

Immediate Delivery. We have in stock a quantity of New TEFC & XP motors.

●

Write, Wire or Phone Us
Your Requirements.

Heat & Power Co., Inc.

Digby 8-0373

70 Pine Street • New York 5, N.Y.

EQUIPMENT FOR SALE

FOR SALE: Cooper skid unit with Allis-Chalmers E 60 engine. Mounted on 6X6 G.M.C. truck. With or without 8 in. X 10 in. X 65 ft. single pole mast. R. G. Scott, Seminole, Okla. Phone 877.

1—4'-0" ID x 40'-6" x 1¼" thick Tower. No trays. Tri-State Supply Company, Box 610, Mt. Pleasant, Texas.

FOR SALE: All steel Gypsy Spudder, mounted on 1½ ton, 1949 Chevrolet truck, portable. Spools 4000 feet, ¾ wire, 3 drum draw works. If you have never seen one of these machines you cannot realize what it will do. Easy to set up. Cheap operating. 10", 8", 6", 5" tools complete. Spiders and elevators to run 10", 8", 7", 5½", 4½" pipe. One, tool trailer, with forge mounted on it. Everything complete. Lots of extra fishing tools. Ready to go. Now working in Greenwood County, Kansas. Sell worth the money. John W. Giffin, Box 182, Eureka, Kansas. Phone 735-R.

COMPLETE Rotary Rig mounted on Dodge Truck, Strong Derrick, Rig strong, sturdy, ballbearing throughout. 5½X10 Mounted Mudpump, Mission equipped. International Engine. Mounted 10 Barrel water Tank. 700 feet 2⅞, 12 pound drill pipe. 1500 foot water or oil rig. Money Maker. 2 men operate. Close Estate $5500. Cash. Box 106, Seminole, Oklahoma.

FOR SALE: 1500 heavy duty Rotary. Mounted on KBS-6-K-7 motor International Truck. Has automatic pull-down hydraulically operated 38 foot mast, raised and lowered by hydraulic. Two drums on draw works and a cathead. 2000 feet of 2⅜ Failing exploration drill pipe, 20 foot lengths. One, 4 x 6 Fairbanks-Morse Mud pump, to be powered by same motor which runs drill. One, 5 x 8 Gardner-Denver mud pump, powered by 6 cylinder Red Seal Continental motor, mounted on skids and carried on 2 ton White Truck. One, dog house on wheels, pulled behind mud pump truck when moving. One, 1947, 2 ton Chevrolet, 2 speed axle and 700 gallon skid water tank with vacuum filling hook-up. Also has winch. One, drill pipe trailer, dual wheeled float type, pulled behind drill truck when moving. One, 5½" drill collar, weighs 5000 pounds. One, Hughes, 20 foot core barrel. All necessary accessories for drilling up to 14" hole. Lots of miscellaneous parts, subs and hand tools, everything complete. Nothing to buy or repair. I have been drilling 1800 to 2250 foot holes, a total of 21,000 feet since new. Am sacrificing for straight sale but will trade if I have to. You will have to see it. Rig now located and working in Greenwood County, Kansas. John W. Giffin, Box 182, Eureka, Kansas. Phone 735-R.

FOR SALE

12,500' rig with Titan-Wilson draw works; powered with three 350 HP LeRoy motors. 2—18" Oilwell mud pumps. 12" QRC blowout preventor. 400 ton traveling equipment and swivel. Vibrator shale shaker. 136' heavy duty derrick. Steel mud house; 2 steel mud tanks. 7½ KW light plant. 10,300' of 4½ Reed extra hole supershrunk drill pipe which has drilled less than 30,000'; 6—6⅛ drill collars. Above equipment is modern and in first-class condition. Contact Vernon Whiteley, Fair Foundation Building, Tyler, Texas; Phone 2-2212.

NEW STEEL PIPE
With Split Seams

18" OD—160 feet
20" OD—800 feet
24" OD—1,320 feet
26" OD—1,360 feet

All 40 ft. lengths.
Approximately ¼" wall.

Write—Wire—Phone

Sonken-Galamba Corp

2nd and Riverview (X-680)
Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

FOR SALE: 24-L Bucyrus Erie Spudder, trailer mounted, excellent condition, complete with tools and wire line ready to drill. Box 1755, Parkersburg, W. Va.

FOR SALE, Auto Car. 7½ ton truck, year 1942, Model C9064, Motor No. 60-2006, Tandem drive, with ten 1100 x 24 tires and Spare tire. Over all length of truck 31 feet, over all width 8 feet. Equipped with 50 ton Braden winch, and flat body with rolling tail gate. Size of body length 18 feet 6 inches, width 8 feet. Progress Iron & Steel Co., 117 East Market St., Louisville, Kentucky.

FOR SALE: 700 feet of good 8-inch Lapweld Casing. G. G. Priestley, 924 Red Oak Street, Charleston, West Virginia. Phone 25393.

FOR SALE: Fred E. Cooper-Allis-Chalmers Model E Double Drum Winch Tractor complete with 85/8" x 7" O.D. 55' mast, dual rear wheels, cross arm spudder and electric starting. Would be ideal for clean out work or pipe pulling. Write or call Buckeye Supply Company, Zanesville, Ohio.

EQUIPMENT WANTED

WANTED: Used Bucyrus-Erie Spudders, sizes 24-L, 28-L and 26-L, Less tools. Write giving all details as to age, condition, location and price. Buckeye Supply Company, Zanesville, Ohio.

WOULD LIKE TO BUY portable rig capable of drilling between two and three thousand feet. State price and condition. Box D-880, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED TO PURCHASE: Used Storage Tanks from 1,000 to 80,000 bbl. capacity, either standing or knocked down. P. O. Box 2297, or phone 4-7492, Tulsa, Oklahoma.

WANTED TO BUY: Seven inch hydraulic Casing Pulling Jacks with spiders. FOR SALE: Cardwell single drum, well service unit. Spools 10,000—¾" wire line. Box 4387, Oklahoma City, Okla.

WANTED

New or nearly new 5½" O.D. H-40 or V-55 seamless oil-well casing. Also 2" upset tubing. Abandoned oil wells. Furnish complete details.

A. C. R. CO.
19615 Nottingham Road
Cleveland 10, Ohio

WANTED

To buy surplus refinery equipment

BOX D-877

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

WANTED—FOR SALVAGE!

We will pay spot cash for:

DISCONTINUED PIPE LINES
and
ABANDONED OIL WELLS

Write us complete details or phone us collect.

VALLEY STEEL PRODUCTS CO.

124 Sidney St. **St. Louis 4, Mo.**
LAclede 2100 **P. L. LaBarge**

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HELP WANTED

EXPERIENCED Sales Engineer to represent established valve manufacturer. Primary objective is development of Petro-Chemical and Industrial outlets, but also to contact Petroleum Producing, Refining and Pipe Line Industries. Technical background and some knowledge of chemicals and metallurgy required. Our men know of this advertisement. Box D-875, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GEOLOGIST qualified for geological work in connection with reservoir engineering. Five years experience necessary. Experience in Permian Basin desirable. Box D-857, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PETROLEUM ENGINEER, experienced, 10 years or more, for employment in South Texas by independent operators. State age, family status and qualifications. Box D-883, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, EXECUTIVES, TECHNICAL MEN. SALARIED POSITIONS—$3600 TO $30,000. THIS CONFIDENTIAL SERVICE FOR OUTSTANDING MEN WHO DESIRE A CHANGE OF CONNECTION. WILL DEVELOP AND CONDUCT PRELIMINARY NEGOTIATIONS WITHOUT RISK TO PRESENT POSITION. SEND NAME AND ADDRESS FOR DETAILS. TOMSETT ASSOCIATES, 1204 BERGER BLDG., PITTSBURGH 19, PA.

HELP WANTED

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

SHIFT SUPERVISOR: Responsible for supervision of Catalytic Cracking and Poly Plant operations, plus general supervision over process workers during shift. Must be experienced and thoroughly familiar with all phases of refinery operation. Location—Artesia, New Mexico. Write New Mexico Asphalt & Refining Company, Artesia, New Mexico, giving full particulars of qualifications, experience and references.

WANTED IMMEDIATELY ENGINEER experienced in natural gas utility field by one of fastest growing natural gas companies in Southwest. Must have following qualifications: More than 30 years of age. Prefer person with college degree in engineering: petroleum, civil or mechanical. At least three years of college and five years of experience with natural gas or natural gasoline company, including the following phases—drafting, compressor station design and operation, hydrogen sulfide removal plants, gas well testing, gas measurement, drilling operations. Salary commensurate with experience. Pleasant working conditions, numerous attractive employee benefits after period of regular employment. Location in Dallas, Texas. Submit abstract of experience, qualifications, employment history to Box D-865, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL ENGINEER: New large oil pipeline company requires electrical engineer to handle design, construction and devise maintenance procedures, all classes equipment to 5-KV switch gear. Some familiarity with sub-stations to 110-KV, 5000-KVA desirable but not required. No communications or electronics involved. Include full professional and personal details and minimum salary, first letter. Job is permanent. Box D-761, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GEOLOGIST, qualified for division Geologist Rocky Mountain area, with minimum eight years' experience. Wide experience desirable; four years' experience in Rocky Mountains required. Location Denver. Write, giving full details. Replies confidential. Box D-830, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: RESEARCH AND DEVELOPMENT ENGINEERS AND PHYSICISTS WITH EDUCATIONAL BACKGROUND IN MECHANICAL, ELECTRICAL OR ELECTRONIC ENGINEERING, PHYSICS OR ENGINEERING PHYSICS FOR OPENINGS IN PLANT AND LABORATORY INSTRUMENTATION, PHYSICAL MEASUREMENTS, GEOPHYSICS, AND INDUSTRIAL ELECTRONICS. PREFER PERSONS WITH TWO TO FOUR YEARS EXPERIENCE IN EXPERIMENTAL RESEARCH DESIGN AND DEVELOPMENT OF INSTRUMENTS, INTRICATE MECHANISMS, ELECTRONIC APPARATUS, OPTICAL EQUIPMENT, SERVO-MECHANISMS OR ALLIED FIELDS. POSITIONS ARE OF IMMEDIATE AND PERMANENT IMPORTANCE TO OUR OPERATIONS. WRITE PERSONNEL DIRECTOR, RESEARCH AND DEVELOPMENT DEPARTMENT, PHILLIPS PETROLEUM COMPANY, BARTLESVILLE, OKLAHOMA.

REFINERY POSITIONS AVAILABLE

Integrated oil company has following position openings in its modernized Oklahoma refinery:

NIGHT SUPERVISOR—CRACKING AND POLY PLANT: Responsible for direct supervision of catalytic cracking and poly plant operations, plus general supervision over all refinery workers during night shifts. Must have chemical engineering degree or equivalent and at least two years experience in catalytic cracking operations.

INDUSTRIAL ENGINEER: Responsible for the investigation of work methods in the processing, maintenance and clerical functions for the purpose of reducing costs, improving quality, or raising yields. Must be graduate Industrial Engineer with three to five years' experience and be familiar with refinery operations.

Reply to Box 1051, Tulsa, Oklahoma, giving education, age, military status, experience, and salary expected.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS

Only Experienced Men Need Apply

WRITE ONLY

WELEX JET SERVICES, INC.
3909 Hemphill Street, Fort Worth 9, Tex.

ENGINEERS, DESIGNERS, DRAFTSMEN

All Grades

Good positions open in San Francisco and Los Angeles — experienced engineers, draftsmen and designers for work on chemical, industrial and power projects. Refinery, process, mechanical, structural and electrical engineers are needed; also qualified layout men, designers and detailers for electrical, structural, mechanical and piping squads.

Write stating experience, education, age, references, salary expected. Applications held in confidence; prompt consideration.

BECHTEL CORPORATION

PERSONNEL DEPARTMENT
ROOM 10

BECHTEL

220 BUSH STREET
SAN FRANCISCO, CALIF.

Positions open for

ENGINEERS

Process (Chemical) Engineers
Construction Engineers
Project (Mechanical) Engineers

To Work On
Petroleum, Petro-Chemical and Chemical Projects

Write in complete detail, giving age, positions held, references, education, salary expected. Personal interview can be arranged.

Address Personnel Department

E. B. BADGER & SONS COMPANY

75 Pitts St., Boston, Mass.

SITUATIONS WANTED

FIFTEEN YEARS Gas, casinghead gas, industry. 36 year old junior executive presently employed, desires change. Box D-862, The Oil and Gas Journal, Tulsa, Oklahoma.

TITLE ATTORNEY—Draft exempt, thoroughly experienced in oil industry, desires connection with a future. Box D-863, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST - GEOLOGIST: Graduate, married, 11 years' experience. Desires position with independent, permanent location only. Reply Box D-868, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY FOREMAN, self-retired recently from major oil company, seeking reemployment. Over twenty years refinery experience, covering all phases. Prefer domestic but will consider foreign service. Fluent Spanish. Excellent references. Box D-872, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED PETROLEUM GEOLOGIST Single, Draft-exempt, Nine years major company experience, four years independent geological experience. Specialist in all phases subsurface and well work. Opportunity for advancement important. Location—open. Box D-874, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Age 46, 24 years experience in drilling and production operations, well completions and workover operations. Desire connection with progressive independent. Immediately available. Box D-873, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. **Makin Drilling Company, Box No** 131. Ph. No. 131. Hobbs, New Mexico

PAST 17 years with major pipe line company; installation, maintenance, operation practically all types prime movers. Diesel, gas, gasoline engines, electric motors. Centrifugal, rotary, and reciprocating pumps. Auxiliary pumping station equipment, automatic controls, manifolds, etc. Seeking advancement opportunities. Best of references. Could you use my experience and qualifications to your advantage, and mine? Address Box D-876, The Oil and Gas Journal, Tulsa, Oklahoma

BSME, 37 months oil field service engineer desires opportunity with a progressive independent doing secondary recovery. Box D-878, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER with 10 years drilling and production experience in West Texas, Mississippi, Louisiana, and Gulf Coast desirous of employment with aggressive, growing, independent or small company in the capacity of production or drilling supervisor. Presently employed by major oil company as area engineer. Draft exemption resulting from service injury. Will furnish personal references and abstract of professional experience upon request. Box D-881, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, ten years varied experience desires responsible position in Rocky Mountains or Foreign. Presently employed; speak four languages. Box D-879. The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG EXECUTIVE, concentrated experience in Finance, Transportation and Refinery Economics. Master's degree, draft exempt, will locate anywhere within U. S. or consider foreign employment. Résumé and photograph furnished upon request. Write Box D-882, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN 32, excellent background of experience in land and title work, desires connection with small or independent company affording full or part time field work. Box D-885, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

PIPE LINE corrosion and communications engineer with ten years experience will consider another position. Box D-884, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

ROYALTY
Am selling a small part of the Gross Earnings, to be known as Royalty, earned by a stated size Drilling Machine. Write O. K. Machine Shop, 1026-16th St., Rock Island, Ill.

SPOT CASH PAID FOR PRODUCING ROYALTY. SMALL TO LARGEST BLOCKS IN SETTLED OR OLD PRODUCTION ONLY. Oil Specialists since 1934. GERBER & CO., 120 WALL STREET, NEW YORK.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington New Mexico.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

LEASE AND DRILLING BLOCKS

ATTENTION OPERATORS AND PRODUCERS: Wanted to purchase—settled oil production with additional proven drill sites, leases producing from 400 barrels daily and upwards, by private party. Replies confidential, no deal too large. Contact William McLaughlin, 432 South New Hampshire, Los Angeles 5, California.

OIL AND GAS LEASE FOR SALE
Court Receiver will offer for sale on February 24 the well-known Storey Lease located in Section 1-17-17. Has 16 shallow wells, 1 shale gas well, all pipe and extensive equipment. Splendid opportunity for repressuring or water flooding. Address Frank Brown, Receiver, Coweta, Oklahoma.

FOR SALE: One Half interest in proven lease in Ector County, Texas, to 5700 feet for $75,000, with return of cost of well out of three-fourths of production. Box 2626, Odessa, Texas.

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, Drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

INVESTMENTS: Excellent opportunities in secondary recovery in Bradford, Penna., district. Principals only. Box D-866, The Oil and Gas Journal, Tulsa, Oklahoma.

THREE virgin structures in a block ½ mile from gas line; three miles from Cookeville; ideal location. N. M. Sauls, Cookeville, Tenn.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

REAL ESTATE

FOR SALE: Scenic 1420 acre ranch; also suitable for dairy or dude ranching. Will run several hundred head cattle and hogs. Lake, fishing ponds, springs, stream. Good fishing, hunting. 85x45 cement barn with seed curing equipment. Two tenant houses, fenced, timber, good soil, on black-top highway, near town and auction markets, electricity; main house has modern conveniences, ideal climate, excellent water. One of the best and prettiest ranches anywhere. Price $55,000.00. Terms. By owner, John Barrett, Cottondale, Florida.

BUSINESS OPPORTUNITIES

WE HAVE 6 million dollars of triple A hotel properties. Today's construction cost would be 20 million; buildings, equipment and furnishings, excellent. Will bear minute inspection. Equities plus depreciation possibilities offer a splendid avenue for substantial annuities plus net earnings. 25% can handle one or two of these properties. Confidential information through Middlewest Hotel Brokers, Suite 814-15, 12th & Walnut Bldg., Kansas City, Missouri.

FOR SALE: 17,000 acre ranch in West Texas with all of the minerals for $7.50 per acre. Write C. L. Milburn, Odessa, Texas.

PRODUCTION FOR SALE

40 ACRES with three sand wells, 1200 bbls. monthly production, near Tulsa. Owners wish to retire. P. O. Box 26, Tulsa.

FOR SALE: 57 Oil and Gas wells, settled production, well equipped. Half may be pulled without affecting production very much. For particulars write Box 1755, Parkersburg, W. Va.

FOR RENT OFFICE SPACE

FOR RENT: 900 square feet office room, open 12 to 2:30 daily, 811 South Boulder, Tulsa. Parking space included. Further information, dial 7-6988.

WANTED

WANTED TO PURCHASE OR LEASE

Petroleum Refinery currently not being used or portion of operating refinery available for sublet for processing and finishing partly refined stocks. Require site located Group 3 with variety unused tankage, railroad siding, barreling facilities or building, high pressure steam, ground space for installation additional refining equipment.

Write full details to

Box D-853,

The Oil and Gas Journal,

Tulsa, Oklahoma

EQUIPMENT MEN

(Continued from page 156)

George Joins Sales Staff of Bingham Pump Co.

Vernon L. George has joined the sales organization of Bingham Pump Co., Portland, Ore.

George, who has a B.S. degree in mechanical engineering from Illinois Institute of Technology, will have headquarters in the company's Chicago office. His technical experience in the industrial field well qualifies him to serve Bingham customers in that territory.

R. T. Haslam Elected to Worthington Board

R. T. HASLAM

Robert T. Haslam has been elected to the board of directors of Worthington Pump & Machinery Corp., Harrison, N. J., according to an announcement by H. C. Ramsey, president.

Haslam was, until recently, a vice president and director of Standard Oil Co. (N. J.). A director and member of the executive committee of Ethyl Corp., he also is a member of the corporation of Massachusetts Institute of Technology.

Graduating from M.I.T. in 1911 with a B.S. degree in chemical engineering, Haslam then joined the faculty. He later became professor of chemical engineering in charge of the school of chemical engineering practice before joining Jersey Standard.

A. O. Smith Promotes McConnell in Export Branch

L. J. McConnell, contract supervisor in the International Division of A. O. Smith Corp., has been promoted to the sales department, it has been announced by W. H. Porth, International division manager.

McConnell will handle the export sales of A. O. Smith's line of petroleum meters and accessories. Porth also announced that C. H. Jewson will succeed McConnell as contract supervisor, corresponding to traffic manager in domestic business.

Du Pont Develops New Tetraethyl Lead Process

A new continuous process for the manufacture of tetraethyl lead has been perfected by Du Pont research men and engineers. Construction will start immediately on the first new continuous production unit which will have an annual production capacity of about 50 million pounds of tetraethyl lead a year. This expansion of tetraethyl lead facilities will substantially increase Du Pont's ability to meet the heavy demand for high-octane fuel.

At the present time, tetraethyl lead is made in batches, a process perfected by Du Pont as early as 1923. In addition to increasing productive output, the new continuous process eliminates the need for equipment made of special steel alloys which are essential in the batch process.

The continuous process tetraethyl lead plant will be located at Du Pont's Chambers Works at Deepwater Point, N. J. It is expected to be in production by January 1952.

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Kansas Fields

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dry, TD 3,350 ft., anhydrite 725 ft., Heebner 2,966 ft., Lansing-Kansas City 3,096 ft., cherty Sooy 3,296 ft., Arbuckle 3,308 ft.

Cowley County: Adair 1 Wheeler, NE SE NW 24-30s-4e, elev. 1,272 ft., dry, TD 2,922 ft., Kansas City 2,267 ft., Bartlesville 2,907 ft., Sooy 2,916 ft.

Dickinson County: Nimrod 1 Foster, NE NE NE 29-14s-4e, elev. 1,322 ft., dry., TD 2,253 ft., Kansas City 1,671 ft., Mississippi chat 2,204 ft., dolomitic lime 2,244 ft.

Ellis County: Anschutz 1 Keagy, NE NE SE 30-12s-19w, elev. 2,175 ft., dry, TD 2,970 ft., anhydrite 1,540 ft., Heebner 3,490 ft., Dodge 3,514 ft., Lansing-Kansas City 3,533 ft., Arbuckle 3,919 ft.

Graham County: Wood River 1 Fabricius, SW SW SW 2-7s-22w, elev. 2,237 ft., dry, TD 3,932 ft., anhydrite 1,903 ft., Topeka 3,250 ft., Heebner 3,455 ft., Lansing-Kansas City 3,479 ft., cherty Sooy 3,823 ft., Arbuckle 3,880 ft.

McPherson County: National Associated Petroleum Co. 1 Sandahl, NE NE NE 21-18s-4w, elev. 1,458 ft., dry, TD 3,750 ft., Lansing-Kansas City 2,442 ft., Mississippi lime 3,107 (?) ft., Viola 3,543 ft., Simpson 3,627 ft., Arbuckle 3,707 ft.

Pratt County: Tatlock 1 Barbee, SW SW SW 19-27s-15w, elev. 2,084 ft., dry, TD 4,886 ft., anhydrite 983 ft., Kansas City 4,033 ft⅜, Mississippi lime 4,540 ft., Kinderhook 4,595 ft., cherty Viola 4,650 ft., Viola dolomite 4,680 ft., Simpson sand 4,725 ft., Simpson dolomite 4,807 ft., Arbuckle 4,854 ft.

Rice County: Weaver 1 Boldt, SE SE SW 3-19s-10w, elev. 1,736 ft., dry, TD 3,315 ft., anhydrite 465 ft., Heebner 2,827 ft., Lansing-Kansas City 2,975 ft., cherty Sooy 3,297 ft., Arbuckle 3,311 ft.

Rooks County: Nadel-Gussman 1 Graham, SE SE SW 29-9s-20w, dry, TD 3,935 ft.

Stafford County: Adair 1 Fair, CEL SE NE 4-22s-11w, elev. 1,744 ft., dry, TD 3,540 ft., Heebner 2,978 ft., Lansing-Kansas City 3,138 ft., Sooy 3,412 ft., Viola 3,423 ft., Simpson 3,458 ft., Arbuckle 3,482 ft.

Alpine 1 Fritzmeier, SW SW NW 25-23s-12w, elev. 1,844 ft., dry, TD 3,861 ft., Heebner 3,219 ft., Lansing-Kansas City 3,389 ft., Viola 3,739 ft., Simpson 3,810 ft., Arbuckle 3,851 ft.

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Instant Accessibility

The new Shand & Jurs breather valve for bulk plant storage tanks provides maximum accessibility to working parts for inspection and cleaning. The vacuum and pressure valve covers are cast in one unit, and this single cover is held in place on the S&J breather valve by one thumb screw mounted on a swinging yoke. Just a few turns of the thumb screw and the cover is instantly removed, exposing both valves to view.

This new S&J breather valve, designated Fig. ST-3695R, is available in 2", 3" and 4" sizes, and has been carefully engineered to give the greatest possible flow capacity. The corrosive resistant construction of the breather valve utilizes valve pallets and pallet seats of thermo-setting molded phenolic. This construction provides greater resistance to shock and corrosion damage, and will assure increased dependability even under the most severe operating conditions. Contact the factory or nearest branch listed below for additional information on the new S&J breather valves for bulk plant storage tanks.

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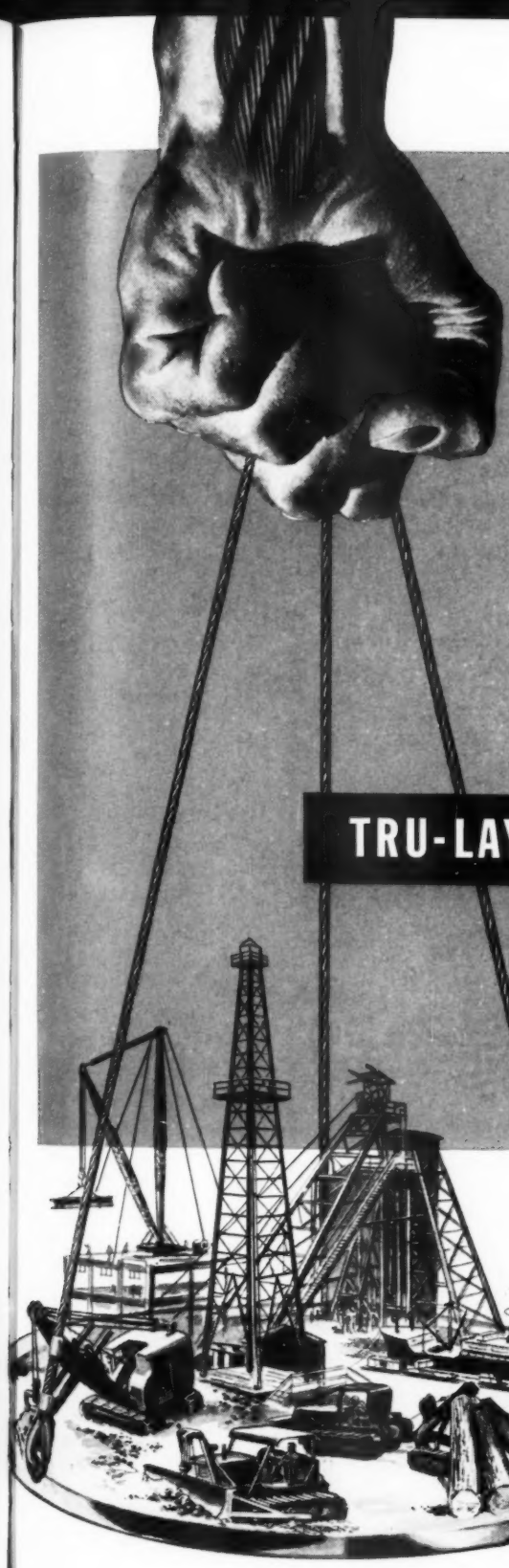
FORT ERIE, Ontario MONTREAL 360 Notre Dame St. VANCOUVER 550 Beatty St. DARLINGTON England



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